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GERMS AND GENERALS.[1]

By F. KINGSLEY NORRIS, M.D.,
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THE time would seem opportune to discuss with you the importance of some of the problems that present themselves to the medical officer in time of war.

The recognized military approach to any problem is by what is known as an appreciation of the situation. Such appreciation is considered under certain headings: firstly, the object to be attained; then the factors which influence the attainment of this object and possible alternatives; and finally, the plan. Let us tonight appreciate the problems of the army medical officer and consider the objectives he strives to attain by his service.

The aims of every member of the Army Medical Corps are clearly defined:

1. The maintenance of the fighting strength of the troops by the prevention of disease.

2. The rapid collection, evacuation and distribution of the sick and wounded from the area of military operations and their efficient medical and surgical treatment.

To many the second—the attention to the sick and wounded—may appear the beginning and end of the medical officer's activities. Certainly the carrying out of these duties is more spectacular and receives more publicity and reward; but tonight I propose to present to you the importance of preserving the health of troops who are well.

In a recent book the army medical officer is presented as one who "takes sick parade—gives cathartic pills—makes transport trouble—com-

[1] Read at a meeting of the Victorian Branch of the British Medical Association on September 6, 1939.

plicates tactical plans and causes the water to smell bad".

Let us turn back the pages of history and consider if the opportunities which are presented to the army medical officer are satisfied by this assessment.

One of the most memorable route marches of all time must be the exodus of the Israelites out of Egypt.

Having crossed the Red Sea, Moses did not follow the coastal caravan route that hugged the shores of the eastern Mediterranean. He passed onwards in a south-easterly direction, through the inhospitable country of Sinai. Possibly it was a wise move—a wide detour against the pursuing Egyptians; but it brought him to the protection of the foothills of Mount Sinai. This was no organized army, but a rabble of men and women, old and young, children and babes in arms. Such an achievement in this dirty, dusty desert was possible only by magnificently organized sanitation, and Moses must go down in history as one of the finest hygienic officers of all time. Time and again these Jewish peopled triumphed over armies many times their numerical strength because they were clean. As they marched up through the country to the east of the Jordan and at last came in sight of the Promised Land, Moses, their great leader, died, and his command was handed on to Joshua. Under Joshua the march continued into Canaan or Palestine. The forcible dispossession of people of their native land has ever been a main spring of war, and for centuries the Israelites were engaged in driving back the Hittites, the Moabites, the Jebusites and the Ammonites. The Philistines from Crete hung to the areas around the coast.

In 1000 B.C. David conquered Jerusalem, finally driving out the Jebusites. Three hundred years later when Hezekiah ruled over the city, down the Jordan Valley came a mightly army of Assyrians under Sennacherib. Chronicles tells that "The Lord sent an Angel which cut off all the mighty men of valour and the leaders and captains in the camp of the King of Assyria". So he returned with shame of face to his own land.

> And the might of the Gentile unsmote by the sword
> Hath melted like snow in the glance of the Lord.

Without irreverence let us remember that the Jordan Valley lies 1,300 feet below sea level and is one of the world's worst malarial districts—hot even in winter; and that Jerusalem rises 2,500 feet above the sea and is cold even on summer nights: then we realize what happened. Infected by malaria in the valley, the Assyrians climbed upwards into the cold of the Judean hills and collapsed—just as Allenby, more than 2,500 years later, attacking through Jericho into the hills of Moab, was almost crippled by mosquitoes.

On the northern coast of the Mediterranean rose the power of Greece. Athens at the height of her culture, her halcyon, Homeric times, was a city of about 250,000 inhabitants, small as cities are considered nowadays; but from her emanated a literature, a philosophy, an art, a drama, that have cast their shadow over history. The early Greeks were healthy outdoor people not given to wandering, and there are no early records of any great epidemics before 430 B.C. other than outbreaks of minor eye disorders and a mild, vague fever, which may well have been Malta fever, since the Greeks cultivated goats in large flocks. But the oracle had spoken:

> Two heavy judgments will befall:
> A Doric war without, a plague within your wall.

From Asia, Xerxes built his decorated, perfumed bridge of boats across the Hellespont and marched his 800,000 Persians to victory at Thermopylæ. The naval victory at Salamis certainly saved Athens; but disentery and scurvy drove the Persian king back with barely half his army. With the constant wars the country people in outlying Greece began to crowd the cities. The year 430 B.C. was a year of hot, blistering summer, and the Athenian plague burst forth with all its horror. There is no medical account of this disaster; the great Hippocrates at this time was at Thasos, and we have to rely on an account by Thucydides, a layman. The true nature of the plague is doubtful; possibly it was typhus or plague, or if we judge from the description of a blistering, pustular eruption prominent on the head and face and spreading over the body, possibly it was smallpox. Whatever it was, with the plague Greece died and Sparta triumphed.

One hundred years later Alexander the Macedonian set out. He marched to the borders of India, he conquered Persia, he passed to Egypt and founded Alexandria. But although Alexander could bridle Bucephalus and defeat Darius he went down before dysentery. Alexander the Great died of dysentery at the age of thirty-six years because he was dirty.

Rose the might of the Roman Empire. Unlike the Greeks, the Romans moved far afield and were continually mobilizing men from all quarters of the then known world. It is impossible to mobilize men without mobilizing microbes. There are always carriers of disease in any community; herd them together and trouble begins. Through the military period of Rome epidemics were persistent. Rome itself was built on hills, as in the valleys—down in the swampy, marshy valleys—hung a bad odour, a *mal' aria*. Against the fever Pliny advised the taking of garlic, which may explain the aroma inseparable even today from certain Mediterranean races. In the Roman Empire the continual wastage by epidemics was probably as great a factor as licentious living in opening the way for the Goths from the north. To the east Constantine had founded a city on the shores of the Bosphorus on the site of Byzantium. Here the might of Rome and of Greek Christianity persisted as a bulwark against the Asiatic hordes, even after the western disasters; but the Justinian plague of the sixth century was the final convulsion of the dying eastern empire. In the eastern Mediterranean plague has never died.

In 571 at Mecca was born Mohammed the Prophet. Driven from his birthplace at the age of fifty-one

years, he set out with his followers armed with his divine messages. From this year the Mohammedan world computes its era. He conquered Mecca and subjugated Arabia, and around the eastern shores of the Mediterranean rose a great Moslem power—the Saracens.

With the advent of Christianity the science and culture of early Greece and Rome were banned as pagan, and for centuries in Europe during the Middle Ages science stood still. Unhampered by such prejudice the early developments were transplanted to Arabia, and momentous strides were made in chemistry, astrology, mathematics and medicine. We owe many of our words to this development—"zero", "cypher", "azure". The Arabs were the first to discover alcohol, nitric acid and sulphuric acid. They wrote of the association of rats and plagues, something that we stumbled on centuries and centuries later. In the history of the Saracens again epidemics played their part. In A.D. 377, in what has gone down in history as the Elephant War, the Ethiopians or Abyssinians bearing their transport on elephants invaded Arabia and halted at the walls of Mecca. A translation of a contemporary account tells that:

> A flock of strange birds flew over from the sea and dropped pebbles from their claws which pierced the armour of the Ethiopians.

The Arabian name of the strange birds, *"ababil"*, seems to stand also for smallpox; so if we translate this picturesque account it would appear that the Ethiopians were repulsed by smallpox, and the power of the Saracens is inseparably associated with this disease. As the early Mohammedans conquered they demanded no indemnity, but merely that the vanquished should adopt the Koran in the original language. In this way, although the Saracens were a composition of diverse tribes and powers, they spoke one language, and so had one great advantage over the Christian enemies of Germanic, Roman, French and English and other tongues.

The Saracens swept from east to west, from the Euphrates to Gibraltar in southern Spain. In the year 700, Charles Martel, at Tours (one of the decisive battles of history), checked their northern invasion beyond the Pyrenees. In the Germanic states Peter the Hermit was preaching the fervor of the Cross against the Crescent, and in the height of this religious zeal the Crusaders set out to conquer the Holy Land from the infidels.

The first Crusade of 1096 was three hundred thousand strong. Sixty thousand Crusaders actually reached Jerusalem; but within two years forty thousand were dead and the Christians were conquered finally, not by Saracens' swords or Saracens' spears, but by Saracen smallpox. The second Crusade under Louis VII of France was even stronger numerically, but was unable to advance beyond Antioch against smallpox and scurvy. The third and the fourth Crusades melted on the shores of the Bosphorus through smallpox, plague and dysentery. Two hundred years later the German emperor Albrecht reached Bagdad on October 1. By October 14 Albrecht was dead and his army routed by dysentery. The Saracens' stocks were high and they passed into western Europe and laid siege to Vienna. When Constantinople was finally captured the ordinary weapon of war proved ineffective; the infidels hurled over the walls the bodies of those dead from plague, and their missiles were finally successful.

During these times the continual struggle between France and Spain was being decided again by epidemics, usually typhus. In the welding of the Germanic states we see the power of typhus. Frederick Barbarossa, the "Red Beard", began the move. Had he stayed at home all would have been well. Influenced by an imperialistic idea he moved with a vast army down through the northern hills of Italy. He lashed the Milanese at Legnano, entered St. Peters and received an imperial crown; and a fleet was assembled to conquer Sicily. Suddenly down came a cloud of typhus, and the Germanic army was decimated. (Frederick, almost alone, struggled home; but his power was broken.) In St. Mark's Cathedral are three slabs of red marble; here before the Pope knelt the great Emperor Frederick Barbarossa and prayed for peace, and the great duchies were shared among lesser men, one of whom, Otto of Wittelsbach, founded a dynasty which lasted until the German revolution of 1918.

The Hundred Years' War, during which England fought for her claim to the French throne, is remembered for its military highlights rather than for its epidemics—for the naval victory at Sluys which gave England the mastery of the channel, the sacking of Poitiers, the victory of Crécy, the conquest of Calais, the battle of Agincourt, the martyrdom of Joan of Arc.

Spectacular and dramatic as they appeared, not one or all of these events together cast a shadow over posterity comparable with the Black Death, a shadow more penetrating and more lasting. Raising its ugly head, as always, in the Far East, the plague passed to Europe in 1347, the year of the capture of Calais. Here the soil was ready; troops from all Europe were in the field, and with the moving and returning troops spread plague—bubonic plague carried on fleas riding on rats. The far-reaching effects, the moral disorder and social upheavals, have left their indelible mark on the history of the world.

As usual the Jews were blamed for the disaster. No Jew was safe from the fury of western Europe. Casimir the Great of Poland offered them sanctuary, and the high proportion of Semitic people in modern Poland is traceable to this persecution.

Accurate figures are unknown; but it is estimated that as a result of this calamity spread by war 25,000,000 people (one-quarter of the entire European population) perished. The social consequences in England alone were revolutionary.

People began to realize that their hitherto accepted advisers were wrong; the clergy were discounted and people demanded to read and think for themselves. The Reformation and the Renaissance were born. The serfs of the fields died in thousands; labourers were scarce and wages were demanded. The standard of living rose. So many land owners died that property ownership was in dispute and lawyers began to flourish. As so happens with any disaster, literature was enriched.

In Florence, in fear of the plague, a group of young men and fair ladies shut themselves away in a palace and began to tell stories of charm and vulgarity, of genius and freedom; these are collected in "The Decameron" of Boccaccio.

The flame of the Black Death died down, but the embers quietly smouldered in Europe.

On August 22, 1485, at Bosworth Field, the crown of England was placed on the head of Henry Tudor, Duke of Richmond. But far more than this happened on this field of battle. As the soldiers straggled home an epidemic broke out, and by September 21 London was seized by the "English sweat". Again it is doubtful as to the actual nature of the disease. John Caius, the founder of the Cambridge college, speaks of the fever—the aches and pains and the profuse sweating. Probably it was a severe form of influenza. Within a week two lord mayors and seven aldermen were dead; but the disease was no respecter of persons and swept over the country. There have been other epidemics of the "sweating sickness", but none so severe as this outbreak in 1485. It crossed the channel and slowly moved eastward over Europe. Quite possibly this epidemic was a factor in the retreat of the Saracens from around Vienna. It was something quite new. But to this day some of the purest Turkish stock survive in eastern Hungary.

In 1494 Charles VIII, King of France, decided to crown himself Emperor of the East. He collected a large army of French, Germans, Swiss and Hungarians, Poles and Portuguese, and a few men from Spain where Columbus had recently been royally welcomed on his return from the newly discovered western land.

The first part of the programme went well. Naples was captured and prematurely Charles received the crown of Jerusalem. Such success alarmed the Pope, and a union with the King of Spain and the Doge of Venice was formed against the new Emperor, who fled rapidly homewards, abandoning his Eastern ambition. The allied soldiers were scattered over Europe. Immediately there broke out a pandemic of syphilis; for the first time the disease was known in Europe. According to which side you supported, the disease was known as the French disease or the Neapolitan disease. Other venereal diseases had been described in early medical literature; but with the moral laxity of the Roman times it is very unlikely that the disease syphilis could have been present and have missed receiving a mention. Beyond reasonable doubt syphilis was introduced into Europe by the returning soldiers and sailors of Columbus. The debt was paid in smallpox. When Cortes landed in Vera Cruz on March 4, 1519, in Narvaez's ship was a negro in the actively infectious stages of smallpox. The disease spread through Mexico and more than 300,000 are said to have died; this was possibly a factor in Cortes's actual conquest.

The sixteenth century in Europe was memorable for the wars between France and Spain. In 1528 the army of King Charles of Spain, commanded by William of Orange, conquered northern Italy, sacked Rome and rested at Naples. This campaign had decimated his army; barely ten thousand men remained. Francis of France realized that this was too good an opportunity to let slip, and he despatched a powerful army of 25,000 men under Marshal Lautrec to seize Naples and crush his rival. The army arrived at Naples; so did typhus; and within a few weeks 4,000 Frenchmen staggered away. The Prince of Orange annihilated this remnant, and for two centuries Naples remained a Spanish possession by the power of typhus.

Twenty-four years later we see the obverse.

Charles, with some 60,000 troops, had closed on Metz, which was garrisoned by 6,000 French under the Duc de Guise. This time the spotted fever turned on Spain; Charles lost 30,000 men, and the account left by Ambroise Paré, the great French surgeon, discloses the horrors of this plague. In 1544 a German army under Joachim of Brandenburg tried to dislodge the Turks from Budapest. Again typhus played its part and wiped out 35,000 of the imperial troops; and Budapest remained under the Crescent for 150 or more years.

Typhus, spotted fever, jail fever was spread over the face of Europe in the sixteenth century, awaiting any mobilization to rear its ugly head and strike with venom.

In 1643 began the Thirty Years' War. In the cause of religion and the domination of the Baltic the campaign swept from the Carpathians to the Rhine. Two great names survive this welter of brutality and bloodshed: Gustavus Adolphus of Sweden, and Wallenstein, the great Bohemian; but the greatest forces were scurvy and typhus. In the 700 encounters there were probably less than half a million battle casualties. Time and again as at Nuremberg the engagement was broken off because there were not enough men fit to fight. Gustavus introduced many army features: a mobile field artillery with the infantry, small regiments, superior muskets, and cavalry equipped for speed charging with naked steel. Among the army of this "Lion of the North" were a few English soldiers, some of whom returning home brought back typhus as a souvenir. At this time began the Civil War in England. At first the Royalist forces held the advantage. They were victorious in northern and western England, and Charles had captured Bristol. In London and the southern countries discontent was spreading in the Parliamentary army. Charles

began to march on London, guarded by Essex. As these forces faced each other at Reading typhus broke out in both armies, and Charles withdrew to Oxford. What might well have proved the decisive battle—Reading—was never fought. Cromwell reorganized his army; Charles's chance was lost; and in 1644 Marston Moor was fought—but typhus had already decided.

We have referred to the power of malaria in the disaster that befell Sennacherib and to the malarial drain on the power of Rome. History relates that just over three hundred years ago a troop of Spaniards were marching through a forest in Peru. They were a motley crew of stragglers, worn and exhausted by chills and fever; one man, unable to drag himself along, fell out and was abandoned as a dying man. Burning with thirst, he dragged himself to a little pool at the foot of an old dead log. He drank and drank the bitter, dirty water and fell asleep in the undergrowth. Next day when he awakened he was well again. He tramped after his troop and turned them back to the pool, this unknown soldier. In triumph the soldiers carried the old log back to their camp—and the fame of its bark grew. Later the wife of the viceroy was cured of her fever and gave her name, Countess of Chinchon, to this miraculous bark.

By this time Henry VIII had assumed his title of Defender of the Faith, and popular prejudice delayed the use of the bark in England for many years until a young apprentice, Richard Tabor, realizing the commercial possibilities of the cure, imported his own private supply and set up in practice in malarial Essex. Lured by London as his reputation grew, he hung out his sign in Holborn. Charles II appointed Tabor his private physician and dubbed him knight. This young man had no recognized qualifications; but Charles, anticipating a natural resentment on the part of the colleges, issued a royal decree that Sir Richard Tabor was his royal physician—let no dog bark. Tabor was sent by Charles to the Court of France, where for the care of the Dauphin he was created a chevalier, and given an annual pension of £100 and a monopoly of his famous remedy for ten years. In Holy Trinity College, Cambridge, a monument was erected over his remains: *"Februm Malleus"*.

And so the horrid story goes on. Early in the French Revolution Frederick William of Prussia, alarmed at the spread of freedom, gathered together with his Austrian allies an army of 42,000 disciplined troops and marched on France. The revolutionaries then were little better than a rabble; but in the Prussian army dysentery broke out, and Liberty, Equality and Fraternity triumphed at Valmy, and a monarchy fell.

In 1801 Napoleon attempted to colonize Haiti. He sent an army of 25,000 men under Leclerc to put down the negroes. The French drove the enemy into the interior; there the *Stegomyia* mosquito took a hand, and 22,000 Frenchmen died of yellow fever and the remainder fled to France.

In 1809 a British army of 40,000 set out to capture the island of Walcheren and Flushing and destroy the great arsenal at Antwerp. Within a few months malaria had cost Britain 20,000 casualties and twenty million pounds sterling, and the expedition was abandoned.

In 1812 Napoleon gathered more than half a million men. From Italy to the Baltic the concentration began. With the convergence of these forces, typhus, dysentery and enteric fever came into the picture. Had Napoleon been content to organize an efficient sanitary control in Poland all might have been saved; but he rushed on with disease in the van. When the fatal retreat began in October there were barely 80,000 men fit for duty. By November 2,000 cavalry remained. By December 20,000 sad and sick men staggered along. Of the third army under Ney 20 men survived. Disease—typhus, scurvy and enteric fever—sealed the destiny of Napoleon. The disaster of the hundred days was the aftermath of 1812.

To come nearer to our own time, the medical conditions of the Crimean campaign of 1853 were deplorable. The death rate from disease—mainly dysentery and typhoid fever—exceeded the battle casualties by five to one. Following the return of the Crimean soldiers there occurred during the nineteenth century one of the few epidemics of typhus in England. In the American Civil War the casualty rate was about the same—five to one, typhoid fever and measles being the powers behind the graves. In the Franco-Prussian War of 1870 smallpox, our old acquaintance, played its part. Jenner's work had been recognized in Germany before England, and the German army entered the field almost completely vaccinated. They lost 297 men from this disease; but the French, with their careless contempt for protection, lost 23,400 men. Again following this campaign a wave of smallpox swept over Europe. For the first time in history the Germans taught the world the lesson that with proper care less deaths may result in an army from disease than from battle.

We slipped badly in South Africa at the beginning of this century. Enteric fever and dysentery claimed far more victims than Boer bullets.

In 1904 in the East began a war that was to have momentous consequences—not only a naval and military triumph for Japan, but a demonstration of army sanitary organization in a filthy country reeking with typhoid fever, typhus, cholera, smallpox and plague. Hygiene sections were formed with each regiment. All the water was tested and labelled ahead of the main bodies of troops. Infectious areas were isolated, mosquito pools were drained. Every soldier received regular lectures on hygiene. All soldiers returning to Japan were quarantined. The incidence of sickness fell to a figure that had hitherto been a dream; no epidemic followed the signing of peace.

In the Great War of 1914-1918 the lessons were remembered. In France, from our experience of the Boer War fourteen years earlier, we might

have expected several hundred thousand cases of typhoid fever each year. During four years there were barely 3,000 cases in all. By means of applied medical science, over 95% of wounded men who reached a base hospital recovered.

But history has a habit of repeating itself. We began this story with the fatal move of Sennacherib and his Assyrians down the Jordan Valley in 700 B.C. In A.D. 1917 Allenby nearly suffered the same fate, and for the same reason.

But perhaps there is an even more striking instance. In the early days of the War, towards the end of 1914, Austria moved down against Serbia. Serbia's force under Putnik was about eleven divisions, 180,000 rifles, 8,500 sabres and 500 guns. Down came nineteen divisions of Austrians under Potiorek—the fifth and sixth armies. The Serbs drove back the Austrians, capturing some thousands of prisoners, and the enflanking movement of the second Austrian army from the north melted away to Galicia. Then both sides sat down. The Austrians, heavily reinforced, watched the Serbs; the exhausted Serbs watched the Austrians; and with this stalemate vanished the dream of a sudden swamping of Serbia and the immediate bringing in of Bulgaria and Rumania to an alliance with the Central Powers. Why this stagnation of activity? With the invasion of Serbia typhus woke up. Serbia entered the War with about 400 medical men. Within three months one-third of these were dead. The houses and the hospitals were filled with dying typhus patients. In less than six months 150,000 people had died. The Austrian prisoners rotted away. All activity ceased. The Austrians and Serbs stood by and watched the fire burn itself out. The Austrian divisions were immobilized; they dared not move forward, they dared not move away; and imagine what these divisions might have meant to the Central Powers at this time—this vital, decisive, early period of the War which, although it was decided, refused to lie down and take the count for another three years.

THE POLYCYTHÆMIAS.[1]

By R. JEREMY,
Sydney.

THE word polycythæmia is used to denote an excess of circulating erythrocytes in the blood. The increase in red cells may be absolute; or relative, that is, an increase per unit volume. Wintrobe[1] found the normal variation to be from 4·6 to 6·2 million erythrocytes per cubic millimetre in men and about 4·2 to 5·4 million in women. Harrop and Wintrobe[2] point out that from a functional point of view it is more exact to apply the term polycythæmia to any increase in the concentration of the oxygen carrying material or red cell mass in the circulating blood; for when the red cells are small and poorly filled with hæmoglobin their count may be moderately increased, yet the hæmoglobin content and the volume of packed red cells may be within normal limits: when there is macrocytosis the mass of red cells may be increased more than their count indicates. Janet Vaughan[3] gives Price Jones's figures—the range of normal in men from 5,100,000 to 6,350,000 and in women from 3,940,000 to 6,080,000 per cubic millimetre. For the hæmoglobin, calculated on the Haldane hæmoglobinometer scale, according to which 105% is equivalent to 14·5 grammes of hæmoglobin per 100 cubic centimetre of blood, the range in men was from 96% to 116% and in women 90% to 110%.

A relative polycythæmia occurs when fluid from the blood plasma is lost; for example, in diarrhœa and sweating, in the perspiration of fever, and in severe diabetic acidosis and coma; the red corpuscles in the circulating blood are more concentrated than normal.

An absolute polycythæmia occurs when there is an increase in the total red cell mass; this is usually, but not always, accompanied by an increase in the circulating blood volume.

Absolute polycythæmias may be divided into: (i) erythrocytosis, comparable to leucocytosis, in which there is a response to some known stimulus; (ii) erythræmia or *polycythæmia vera*, a disease of unknown origin, which is always accompanied by an increase in blood volume.

ERYTHROCYTOSIS.

Erythrocytosis of the New-Born.—Variable figures for erythrocytosis of the new-born have been published. It has been noted that there are fewer red cells and less hæmoglobin in infants whose cord has been tied earlier than in those separated from the placenta later; it has also been noted that the maximum red cell count in the new-born coincides with the minimum body weight. The number of red cells drops below the birth value early in the second week. The usual explanation of erythrocytosis of the new-born is that the polycythæmia is a compensation for the oxygen unsaturation of the fœtal tissues *in utero*. It has also been found that the blood volume in the new-born varies according to the time the umbilical cord is tied.

Congenital Heart Disease.—In cases in which a partial shunt of blood from the pulmonary circuit occurs there may be a polycythæmia; the red cell counts may be very high and an enlarged liver and spleen may be found. Polycythæmia may occur in acquired heart lesions when oxygenation of the blood is deficient, especially in mitral stenosis.

Pulmonary Disease.—Pulmonary affections sometimes cause deficient oxygenation of the blood; especially is this true of emphysema.

Ayerza's Disease.—Ayerza's disease is a combination of a pulmonary and cardiac condition;

[1] Read at a meeting of the Section of Medicine of the New South Wales Branch of the British Medical Association on October 12, 1939.

the earliest symptoms are pulmonary—asthma, bronchitis, with dyspnœa and cyanosis—and the later symptoms are cardiac, and arise from failure of the right side of the heart. This disease is the result of obstruction to the pulmonary circulation from luetic or non-luetic pulmonary artery disease.

High Altitude Polycythæmia.—The effect of oxygen want at high altitudes in producing polycythæmia has long been known. Carlos Mongue,[4] in discussing high altitude disease, states that acclimatization to altitude may be congenital or acquired, and that the latter type requires a readjustment of biological mechanisms for fitness to life at a high altitude. He mentions Father Calancha's observations, published in 1639, that the Spanish conquerors who went to the mines at Potosi, Bolivia, at an altitude of 14,000 feet (4,300 metres), had no offspring until fifty-eight years after the city was founded. He believes that acute and chronic forms of mountain sickness exist, and that the latter closely resembles true erythræmia. He states that hypertension rarely occurs, and that in the absence of cardiac failure the spleen is not often enlarged (two instances in 17 patients). He mentions hæmoglobin values as high as 179% and hæmatocrit readings in which the erythrocytes make up to 90% of the blood volume. There is an increase in the number of reticulocytes, but the occurrence of abnormal lecocytes and a pronounced leucocytosis and immature red cells he does not describe. He classifies a third variety, the emphysematous type, closely resembling Ayerza's disease, with terminal insufficiency of the right side of the heart.

Polycythæmia from Chemical and Physical Agents.—Polycythæmia may occur in poisoning by aniline dyes and carbon monoxide. Cobalt has been used to produce experimental polycythæmia; and it is of interest that Corner[5] has found that cobalt will cure an anæmia in ruminants occurring when there is cobalt deficiency in the soil. The presence of abnormal blood pigments, sulphæmoglobin and methæmoglobin is often associated with some polycythæmia. There are many other chemical agents which will produce polycythæmia.

Erythræmia or Polycythæmia Vera.

Erythræmia or *polycythæmia vera* "is a slowly and intermittently progressive disease of unknown etiology characterised by a striking absolute increase in the number of red blood corpuscles and in the total blood volume, and frequently by the signs of generally increased bone marrow activity. Clinically these changes are indicated particularly by a peculiar reddish purple colour of the skin, various vasomotor and neurologic manifestations, and usually splenic enlargement" (Harrop and Wintrobe).

Vaquez[6] published the first case report of erythræmia in 1892; he did not comment on the associated leucocytosis. Turk[7] in 1902 and 1904 reported seven cases, and drew attention to the occurrence of leucocytosis. Osler[8] published his well-known papers in 1903 and 1904. Other notable reviews have been by Parkes Weber[9] in 1921 and 1929, by Harrop[10] in 1928, and by Harrop and Wintrobe[2] in 1938.

Ætiology.

The disease usually occurs in males from thirty-five to sixty-five years of age; it is extremely rare in children. Some observers, including Parkes Weber, consider that it is more common in Jews. This is not borne out by examination of case records in the hospitals in Sydney. Hereditary and familial instances have been reported, but there is doubt whether they are the same disorder which occurs in isolated cases.

Many theories as to the pathogenesis of the disease have been propounded. It is known that splenomegaly with polycythæmia may occur in tuberculosis of the spleen and in thrombophlebitis of the splenic vein; it has been suggested that in these instances there may be suppression of the hæmolytic action of the spleen or suppression of its regulatory action leading to increased bone marrow activity. Examination of the spleen in erythræmia does not suggest a splenic origin for the disease; the enlargement is mainly due to congestion with blood. The hyperactive bone marrow is the striking feature; although there is evidence of blood destruction in the presence of urobilinuria and excess of stercobilin in the fæces, the response to the Van den Bergh test may be negative and the icterus index of the serum not raised. In an analogy with high altitude disease, anoxæmia of the tissues is a reasonable explanation. Reznikoff, Foot and Bethea[11] examined bone marrow specimens from patients with erythræmia and found "distinct capillary thickenings, probably fibrosis, with some cases showing in addition marked subintimal and adventitial fibrosis of the sub-arteriolar capillaries, arterioles and arteries". In patients with general arteriosclerosis, medial fibrosis was evident. They suggest the possibility that these changes may cause anoxæmia of the bone marrow with compensatory polycythæmia. Freifeld[12] suggests that an unknown agent causes stimulation of myeloid tissue with the formation of large numbers of megakaryocytes; these cells plug the lung capillaries, interfere with oxygen exchange, and the latter leads to the development of polycythæmia. The disease has been regarded as an antithesis to pernicious anæmia with an excess production of gastric hæmopoietic factor. According to this line of reasoning, patients have been treated by gastric lavage and by X rays applied to the stomach area; suggestive, but not conclusive, results have been obtained. Hallock[13] suggests that a disturbance of lactic acid metabolism is related to the actual cause. Lack of hormonal control of hæmopoiesis is suggested by the occurrence of polycythæmia in Cushing's disease, pituitary basophilism, which is usually associated with adrenal cortical tumour. Gunther[14] reviewed 21 cases of suprarenalism with virilism, and found high red cell counts in those patients whose blood had been examined. Barker and Craig[15] reported

two cases of intracranial lesions with relative polycythæmia; the lesions were not definitely localized, but produced internal hydrocephalus; the findings were presumed to result from hypophyseal or diencephalic disturbances.

Symptoms.

Erythræmia may be present and the patient may feel himself to be quite well. The date of onset of the disease is usually ill defined. In a review of 17 case records at a Sydney metropolitan hospital the following symptoms were recorded: pain and lump in the left side of the abdomen, with indigestion, constipation and loss of weight; subcutaneous hæmorrhage into the arm; fullness in the head; bleeding on the legs and forearms; giddiness, palpitation, headaches, heaviness in the head, flushings, fog-like cloud over vision; mental depression, sleeplessness, redness of the skin and blueness of the fingers in cold weather; fatigue after exertion, especially in the hot weather; fainting, headaches, red spots under the skin, rash on legs, swelling of abdomen (ascites); aphasia; severe abdominal pain (from ruptured duodenal ulcer); "treatment for nine years for skin complaint"; dizziness, loss of power in legs; attack of severe giddiness with nausea, vomiting and double vision; profuse bleeding after tooth extraction; bleeding from the bowel; epistaxis.

Physical Signs.

The skin colour differs from ordinary cyanosis, and varies with the effect of external temperature. A patient of Osler was red as a rose in the summer and as blue as indigo in winter. In some cases the typical brick-red colour may be absent—the "pale polycythæmias". Ecchymotic skin lesions are common. Weidman and Klander[16] divide the skin lesions into (*a*) the typical red colour of the skin, (*b*) ecchymosis, (*c*) *acne urticata*; they use the term polycythemids. The mucous membranes are red and congested.

The heart is not usually enlarged, and hypertension is frequently absent; the blood pressure is kept at a normal level by compensatory dilatation of the capillaries. Hypertension and polycythæmia occur in the variety of the disease known as *polycythæmia hypertonica* or Gaisbock's syndrome. The spleen is not enlarged and albuminuria is common. Weber considers this type to be a secondary polycythæmia; or else that arteriosclerosis has chanced to complicate erythræmia.

Peripheral vascular disease is said to be common in erythræmia; Brown and Giffin[17] discuss this association. They found twenty-seven patients with peripheral arterial disease among one hundred with *polycythæmia vera*. They divided these patients into the arteriosclerotic, those with *thrombo-angiitis obliterans*, and those with vasomotor disturbances. They found that the patients with arteriosclerosis and claudication showed a marked increase of tolerance to exercise after the use of phenylhydrazine. One patient with *thrombo-angiitis obliterans* and impending gangrene was not benefited by treatment. Spastic phenomena of the Raynaud type were greatly relieved by the reduction of the blood volume. They consider that the erythromelalgia of Mitchell is extremely rare, and that it is often wrongly diagnosed from the rubor caused in arterial occlusion by arteriosclerosis or *thrombo-angiitis obliterans*.

Visual disturbances are common. Foster Moore[18] states that there may be serious disturbances of vision, approaching complete blindness, with almost no ophthalmoscopic changes. Subjective disturbances of vision are common, and there may be scotomata, hemianopia and diplopia. The fundi show marked engorgement of the retinal veins with hæmorrhages, the arteries being of normal size; there may be papillœdema resembling that produced by cerebral tumour.

Ménière's syndrome occurs and was described in Vaquez's original patient.

Peptic ulcer is often associated with erythræmia; its occurrence has been explained on the basis of thrombosis of gastric vessels which are subsequently eroded. Massive gastro-intestinal hæmorrhage may occur, amazingly rapid blood regeneration to the previously high levels is seen when the patient survives.

Liver disorders are frequent. Sohval[19] reviewed 50 cases and in 50% found a moderate or marked enlargement of the liver. Its enlargement is due in his opinion to simple engorgement with blood or to complications such as phenylhydrazine jaundice, leuchæmic transformation, myocardial decompensation, cirrhosis of the liver and thrombosis of the hepatic and portal veins. He considers that the occurrence of cirrhosis of the liver in *polycythæmia vera* is more than a coincidence; all types may occur; fibrosis may follow thrombosis of the hepatic veins. Thrombosis of the portal vein is a complication of pre-existing and often unrecognized *polycythæmia vera*. Enlargement of the liver is constant in thrombosis of the hepatic veins, frequent in cirrhosis and uncommon in thrombosis of the portal vein. Ascites is constant in thrombosis of the hepatic veins, frequent in cirrhosis and uncommon in thrombosis of the portal vein. In five cases of *polycythæmia vera* Sohval found a development of collateral circulation in the hepato-duodenal ligament, sufficient to prevent the formation of ascites. Mercurial diuretics appear ineffective in ascites due to thrombosis of the hepatic veins and successful when it is due to cirrhosis. He concludes that when a patient with *polycythæmia vera* presents an enlarged liver and ascites of non-cardiac origin, the diagnosis is in all probability a complicating hepatic cirrhosis, or thrombosis of the hepatic veins or both, rather than thrombosis of the portal vein. The spleen is enlarged in 75% of patients; it is hard and firm and may reach to the umbilicus; pain over the splenic area may occur from infarction with perisplenitis.

Bronchitis and emphysema are common. X ray examination reveals increased lung markings, pre-

sumably owing to congestion with blood. Hirst[20] reports the occurrence of spherical circumscribed shadows in the pulmonary fields; these shadows fade out in the course of weeks, and may leave no trace of their existence. The association of gout with erythræmia has been frequently noted; there is said to be an increased endogenous uric acid metabolism.

The Blood.

There is evidence of increased erythrocyte, leucocyte and platelet formation. The red cells may number from seven to twelve million per cubic millimetre. Harrop and Wintrobe[2] have seen a patient with 80·8 cubic centimetres of packed red cells in 100 cubic centimetres of blood, and with a red cell count of 10·2 million per cubic millimetre. They quote Zadek as having recorded a patient with 10·37 million cells and 92 cubic centimetres of packed red cells in 100 cubic centimetres of blood. The number of cells which the blood can contain varies with the size of the cells. It has been calculated theoretically that with cells of normal size the circulatory system would be unable to contain the blood if the count exceeded 13,900,000 (Whitby and Britton[21]). Todd and Sandford[22] quote Morris as recording a count of 15,900,000 cells per cubic millimetre. Whitby and Britton give the highest authentic count of 13,600,000 by Koester[23]. The colour index varies from about 0·7 to 1·0.

The hæmoglobin content is considerably raised, and values from 18 to 24 grammes per 100 cubic centimetres of blood are often found. The red cells usually appear normal, except after hæmorrhage, when they may become pale and the colour index may fall. There may be some anisocytosis with microcytes and polychromasia with some excess of reticulocytes. Nucleated red corpuscles may often be seen. Platelet counts may be up to four times the normal values. Naegeli[24] states that megakaryocytes may be found in the peripheral blood. It is usual to find a polymorphonuclear leucocytosis with a count of 10,000 leucocytes per cubic millimetre or over. Counts up to 80,000 leucocytes have been found. There may be an increase of metamyelocytes; some myelocytes and even myeloblasts may be seen. The bleeding and coagulation times are normal; the clot retraction may be slow and incomplete. The blood viscosity is greatly increased. The total blood volume is increased. Rowntree, Brown and Roth,[25] in a study of fifty cases of erythræmia, found values of 126 to 246 cubic centimetres per kilogram of body weight, with an average of 167 cubic centimetres as against a normal mean of 87 cubic centimetres. The plasma volume is not increased.

In the bone marrow the yellow marrow is largely converted to red. Turnbull[26] describes the microscopic findings:

> Very large groups of myelocytes of all kinds, and hæmocytoblasts, and often large nodes of lymphocytes are found. Erythropoiesis is not obviously in excess of leukopoiesis in microscopic section if account is not taken of the hæmocytoblasts, most of which appear to be connected with erythropoiesis. The distension, which is usually enormous, of the vascular spaces with erythrocytes, must be a most important factor in giving the red colour to the marrow.

Other observers, including Naegeli, state that an excess of megakaryocytes may be found.

The Course of Erythræmia.

The course of the disease is chronic, with remissions and exacerbations. Patients may live from ten to twenty years. Vascular complications, such as cerebral thrombosis or cardiac failure, may prove fatal. Uræmia may occur in the hypertensive group with renal damage. A not infrequent termination is in myeloid leuchæmia—erythro-leuchæmia. Aplastic anæmia may develop.

Rosenthal and Bassen[27] classify seventy-five cases from their experience, which has been extensive. They group their cases into the following clinical varieties.

1. The asymptomatic phase.
2. The symptomatic polycythæmic phase (in this group they state that erythromelalgic symptoms may be the sole complaint, even when no vascular disturbances are discernible).
3. Polycythæmia with thrombocythæmia (30% of their patients).
4. Polycythæmia associated with increased leucoblastic and megakaryocytic activity: (*a*) polycythæmia with polynucleosis (polynuclear cell leuchæmia), which may go on to (*b*) polycythæmia with myeloid leuchæmia (erythro-leuchæmia).
5. Chlorotic polycythæmia, in which the red cell count remains high, but the hæmoglobin value is normal or subnormal; the cells when examined in stained smears may resemble those seen in severe hypochromic anæmia. Rosenthal and Bassen regard this finding as a response to therapy.
6. Polycythæmia with a long normal state, induced by radiotherapy.
7. Anæmic phase, which occurs unless the disease is terminated by a vascular complication or the erythro-leuchæmic phase. There may be no anæmia, leucopenia and thrombopenia; or anæmia and thrombocythæmia; or anæmia and myeloid leuchæmia.

Rosenthal and Bassen consider that the disease should be regarded as an ever-changing condition. In their comment they state that Freund in 1919 noted the transition of established polycythæmia of many years' duration to a hyperchromatic anæmia resembling pernicious anæmia, and they quote Hirsch as finding an extensive osteosclerosis with polycythæmia.

The Diagnosis of Erythræmia from Erythrocytosis.

The red cell count in erythrocytosis is usually not so high, but it may be so. All causes of secondary polycythæmia should be ruled out. There should be evidence of increased marrow activity, such as the presence of occasional normoblasts, increased reticulocyte count, leucocytosis and thrombocytosis. Naegeli considers that an increase of basophile cells up to 2% or 3% is significant. Haden,[28] using blood volume determinations and hæmatocrit readings, considers that the most sensitive and reliable indicator of the presence of erythræmia is the increase in the red cell mass per kilogram of body

weight; he states that it is constantly increased in *polycythæmia vera*, but seldom increased in symptomatic polycythæmia.

Treatment.

The aim of treatment should be the reduction of the number of red cells in the circulation. There is no place for splenectomy. It has been suggested that a diet poor in the extrinsic factor of Castle be used; this would be difficult to maintain over a long period. Some benefit may be derived by reducing the amount of animal proteins and purines in the diet.

Venesection.

As symptomatic treatment the removal of from 20 to 40 ounces (600 to 1,200 cubic centimetres) of blood by venesection may give relief; and repeated venesection has been used to produce more permanent effects. It is the safest form of treatment, and in *polycythæmia hypertonica* it is probably the best treatment for the relief of symptoms. In discussing its use in the treatment of erythræmia, Stephens and Kaltreider[29] state that this method is not followed by any significant increase in the percentage of reticulocytes as after the use of phenylhydrazine. Their findings suggest that venesection is followed by microcytosis and hypochromia, and the use of phenylhydrazine by an increase in cell size and hæmoglobin content. They advocate the withdrawal of 500 cubic centimetres of blood at intervals of one to three days until the desired erythrocyte count, hæmoglobin value and hæmatocrit level is reached. They point out that by the use of venesection large amounts of iron and other erythrocyte building materials are removed from the body and are no longer available for the resynthesis of hæmoglobin. Davidson[30] gives a warning that owing to the increased viscosity of the blood, venesection may be difficult to perform. He recommends that suction be used on a wide bore French needle previously washed with a solution of sodium citrate, and that the needle be introduced in a direction opposite to the blood stream.

Hæmolytic Drugs.

Benzol is no longer used. Eppinger and Kloss[31] first used phenylhydrazine in 1918. It is given as freshly prepared phenylhydrazine hydrochloride in capsules. It has a pronounced hæmolytic action with a cumulative and delayed effect, and must be used with great caution. When its administration is carefully supervised, harmful effects will probably not occur. It should not be used in the treatment of a patient with hepatic or renal disease. Giffin and Conner[32] consider that the drug should not be given, or at least should be given with extreme caution, to those who are bedridden, to those over sixty years of age, to those with advanced arteriosclerosis, or to those who have any history of thrombosis. Its disadvantages are that the amount required to produce an effect varies in individual cases and that extreme anæmia may be produced; and owing to its cumulative and delayed action, the degree of hæmolysis produced may be difficult to predict. A marked thrombocytosis may occur after its use, with a tendency to thrombosis. Dorothy C. Hare[33] records a thrombocytosis reaching 2,082,000 platelets per cubic millimetre after the use of phenylhydrazine. The earliest effect seen in the peripheral blood is a polymorphonuclear leucocytosis; the drop in the erythrocyte count occurs shortly after the leucocytosis, and the count may continue to fall for seven to ten days; evidence of red cell regeneration soon appears in the peripheral blood. The blood volume diminishes. Some jaundice may appear, but with reasonable dosage there does not seem to be a risk of permanent liver damage. McCance and Widderson[34] found that the most rapid blood destruction took place after the drug was discontinued, and that the blood urea content rose to 145 milligrammes in 100 cubic centimetres of blood, with a coincident fall in the urea clearance; they gave doses of 0·3 gramme each day to a total amount of 4·2 grammes. Giffin and Conner[32] recommend 0·1 gramme two or three times a day to a total of three or four grammes, with blood counts every second or third day. A rest of seven to ten days is given and if a blood count of five to six million per cubic millimetre is not reached, a further gramme of the drug is given. For maintenance dosage in continued treatment 0·2 to 0·4 gramme once a week is sufficient, but this may vary with the individual. Giffin and Connor state that after three or four years of treatment the drug can be dispensed with for months at a time. McAlpin and Edsall Smith[35] recommend 0·1 gramme once a day for two or three successive days, the erythrocytes being counted once a week. They hold that this should be continued for three or four weeks without change in the dosage; that, if necessary, the dose should be increased to 0·4, 0·5 and 0·6 gramme a week, and that the drug should be given again if the red cells have not decreased more than one or two million per cubic millimetre. Harrop and Wintrobe consider that it is best not to give more than a total of 1·0 gramme divided in equal daily portions for five to ten days. Naegeli recommends from 0·1 to 0·3 gramme once a week, and never more than this; and that blood counts should be made every week as a control.

Many workers consider that acetyl phenylhydrazine should be used; it has a similar action to phenylhydrazine, but is said to be less toxic.

Irradiation.

Sufficient irradiation must be given to inhibit or depress, but not to destroy, erythropoiesis. In the past, X rays were often directed to the spleen; it is more rational to attack the sites of blood formation in the long bones. Pack and Craver[36] gave exposure to all the bones except the pelvis and skull; three to six exposures were given each week until all the bones had been treated. The treatments were repeated every three to six months as required.

The X ray dosage necessary is determined by individual responses and the blood counts must be

carefully watched; danger may be indicated by the occurrence of leucopenia. Spray X ray therapy (total irradiation, teleröntgenotherapy, Röntgen baths) has been advocated. Hunter[37] found that 1,000 *r* given over several weeks produced remissions lasting three years in two cases of erythræmia. It is considered that X ray therapy is less likely to produce thrombosis than the use of phenylhydrazine.

Arsenic has been used in the form of *Liquor Arsenicalis* given in courses of treatment up to the maximum dosage.

For the relief of the peripheral vascular symptoms, daily intravenous injections of 250 cubic centimetres of freshly prepared physiological solution of sodium chloride may be tried.

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GASTROSCOPY: SOME OBSERVATIONS AND CASE REPORTS.

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BEFORE commencing the following observations I should like to make brief mention of gastroscopy as seen by me abroad in 1937 and 1938. Although it is a comparatively recent innovation in London, it is remarkable to note the enthusiasm and capability with which this work is being carried out in that city. Those in London whose work I had the privilege of seeing were Rodgers, Edwards, Lintott and Taylor. I am chiefly indebted to Rodgers, of whose work I saw the most.

Korbsch, at Oberhausen, in Germany, is the only exponent of the rigid instrument whom I saw while abroad. In his dexterous hands it is a remarkably efficient instrument. It gives a very clear picture; but the risk attached to its insertion by the inexperienced prohibits its more general use.

Henning and Keilhack, at Furth, in Germany, are, like the British, exponents of the flexible instrument of Schindler and Wolf, but they use the sponge tip to the instrument instead of the rubber finger tip in more general use in England and America. Schindler, of Chicago, whose flexible instrument has made gastroscopy generally possible, and whose impress seems to be on every gastroscopist, has made a classification of gastritis which seems to have been generally adopted. It is very impressive to see himself and his very capable wife working in collaboration. His simplicity is one of the most likable traits of this great gastroscopist. For further details of his work the reader must refer to his excellent text-book on gastroscopy and to numerous articles.

The methods of Moersch at the Mayo Clinic do not seem to differ in main essentials from those of the others already mentioned. A point worthy of note is Schindler's insistence that gastroscopy falls

within the province of the medical gastro-enterologist, and that it should not be relegated to an endoscopist.[1] This should lead to its more general adoption in the near future.

I feel, in spite of any aspersions that may be cast or any extravagant claims that may be made, that gastroscopy will supply a long-felt want in gastro-enterology.

The preliminary preparation and anæsthetization of the patient are simple; the introduction of the instrument in the average case is not difficult; the interpretation of the findings seems, in some cases, the most difficult part of the gastroscopic examination.

With regard to the history and development of the gastroscope I shall say nothing here; I can only refer the reader to Schindler's and Henning's excellent monographs for that information. I shall mention only the perfection of the flexible gastroscope by Schindler and Wolf in 1932, and the fact that rigid instruments only had been used prior to this date.

One of the first essentials to remember with regard to gastroscopy is that the instrument is introduced with the patient lying on the left side; in consequence the normal anatomical relationships are considerably altered, and additional difficulty is created in the problem of orientation.

No attempt will be made to recapitulate the scope of the excellent article written by Horan,[2] of Melbourne.

Premedication in my opinion is an advantage; one-sixth of a grain of morphine sulphate with one one-hundred-and-fiftieth of a grain of atropine sulphate given by hypodermic injection one hour before examination has been the routine treatment. Too large a dose is inadvisable, as the cooperation of the patient is very necessary.

The usual 2% solution of "Decicain" seems a satisfactory local anæsthetic. For the application, an ordinary three cubic centimetre syringe with a hollow laryngeal probe attached is used, as advised by Rodgers. A little of the solution is sprayed into the back of the throat, the patient being instructed first to gargle and then to swallow it. A wisp of cotton wool is wrapped round the roughened surface of the probe. The wool acts as a brush, being kept moistened by pressure on the plunger of the syringe. About three to four cubic centimetres of the solution have been used in each of these examinations, and no ill effects of any kind have so far been noticed; nor were any ill effects apparent in about 100 examinations which I attended while abroad. Rarely convulsions have been reported with its use,[3] and even one or two fatalities, although other factors seemed to be contributory to the latter.

Mr. P. T. E. Hancock,[4] in discussing an article by Lintott, makes the following statement:

> I have, however, developed what I believe to be an improvement in technique, at the same time adding a safety factor. I have pastilles made for me which contain one grain of decicain in a plain gelatin base. This pastille is sucked by the patient twenty minutes before instrumentation. As a result of this, the patient usually has almost complete anæsthesia of the mouth and throat at the time of instrumentation and frequently no further anæsthesia is required.

Opportunity for the use of these pastilles has not so far arisen in my experience.

A practical though minor point in technique is that frequently much less difficulty is encountered in the preliminary passage of the stomach tube if this is performed with the patient lying on the left side, in position for the ensuing gastroscopic examination.

It is also essential to pass the gastroscope rapidly through the length of the œsophagus to prevent the occurrence of spasm. It seems a safe precaution to recommend the patient to avoid taking anything by mouth for about one hour after the examination.

To some patients gastroscopic examination is an ordeal; it certainly is not so for the majority.

> One recent case in point was that of a nurse, aged twenty-one years, who asked for an examination, underwent it, and fairly leaped off the table at the conclusion of it and would have been quite prepared to resume duty if it had been necessary.

The following is a brief résumé of some 120 cases which I have dealt with in Sydney:

Uncomplicated Gastritis:	
Chronic superficial form	11 cases
Atrophic form	15 cases
Hypertrophic form	2 cases
Gastritis of the post-operative stomach	6 cases
Complicated Gastritis:	
Superficial, merging into the atrophic form	4 cases
Gastric ulcer with superficial form	4 cases
Duodenal ulcer with superficial form	2 cases
Carcinoma with atrophic form	4 cases
Peptic Ulcer:	
Of the body (lesser curvature)	10 cases
Of the body (posterior wall)	1 case
Of the body (lesser curvature, with duodenal diverticulum)	1 case
Of the pylorus, with cicatricial contraction	1 case
Of the duodenum	10 cases
Of the duodenum, with adhesions	1 case
Of the duodenum, with obstruction	1 case
Of the duodenum, with gastro-enterostomy	7 cases
Of the duodenum, with gastric ulcer	1 case
Carcinoma:	
Carcinoma	5 cases
Tuberculosis:	
Tuberculosis of the stomach	1 case
Other Findings:	
Œsophageal varices	1 case
Diverticulum of the stomach	1 case
Coin in the stomach	1 case

In addition normal findings resulted in one case of mild hypertension, in four cases of visceroptosis,

in one case of pyloric ulcer, in one case of cholelithiasis, in four cases of hypochromic anæmia apart from varying degrees of pallor of the mucosa, and in twenty-four cases in which there was history of gastric symptoms varying from aerophagy to fullness after food, pain after food *et cetera* with normal radiographic findings.

Before proceeding further, I must mention how difficult it is to avoid drawing on the father of gastroscopy, Schindler, if not in word at least in deed, for much of the valuable information available in the gastroscopic world today.

The cases of gastritis under examination have been grouped according to Schindler's classification. The patchy redness, œdema, and exudation of the superficial form[1] have been observed; but in these few cases small erosions, though noticed, could not be described as frequent.

The greyish mucosa, visible submucosal vessels and mucosal hæmorrhages[1] of the atrophic variety have been well seen. Two cases are mentioned as belonging to the hypertrophic variety of gastritis.

The cases of gastritis of the post-operative stomach here mentioned were not of the very severe type described by Schindler. Future observations may not prove so fortunate in this respect.

The next group described as the superficial type merging into the atrophic variety of chronic gastritis has recently been classified by Schindler[8] as "the chronic superficial atrophic gastritis group". The discovery of this group is a tribute to his genius; the same applies to his discovery of the sequence of chronic superficial gastritis, atrophic gastritis and eventually carcinoma. Although achlorhydria and atrophic gastritis may vary in their origins, let us hope that the suggestions of Hurst and Schindler may in the near future guide us in the direction of ascertaining the basic cause of carcinoma of the stomach.

This "chronic superficial atrophic gastritis group" is readily observable, and is very striking. The superficial type is seen beside the atrophic variety in the same stomach—one merging into the other.

My next heading introduces to us the subject of peptic ulcer, of which only brief mention can be made here. Multiple gastritic ulcers have been seen; but so far not more than one peptic ulcer has been seen in the same stomach. It will be noticed that most ulcers seen have been situated on the lesser curvature. They have varied in size, and have generally had a yellowish base and well-defined margins, sometimes with reddened edges and sometimes not. In some cases mucosal hæmorrhages only have accompanied them, in other cases a frank superficial gastritis has been observed. The healing of one ulcer only has so far been observed, and no opportunity to observe malignant degeneration in a simple ulcer has so far arisen. Indirect evidence of pyloric ulceration has been observed—for example, the "Gothic arch" appearance of the incisura. There has also been indirect evidence of duodenal ulceration in the form of pronounced inaccessibility of the pylorus to observation and also at times of the antrum owing to cicatricial changes. The large folds found so often in the presence of duodenal ulceration, and difficult to obliterate with air inflation, are in strong contrast to the small folds accompanying atrophic gastritis which are so easy to obliterate. Rodgers's[6] finding of small folds with a low acid content and *vice versa* seems to hold true.

Mention must be made here of the case of a man, aged forty-five years, who complained of persistent vomiting after food, of epigastric pain and of loss of weight of two weeks' duration. Fifteen years previously he had had a rupture of a duodenal ulcer; this had been oversewn.

X ray examination confirmed a diagnosis of duodenal obstruction. As a preliminary to gastroscopic examination eight ounces of bile-stained gastric juice were withdrawn with the stomach tube. Gastroscopic examination revealed a pyloric antrum and pylorus quite devoid of peristaltic movement. The pyloric orifice remained widely open like a porthole throughout the examination.

With medical treatment only the patient's symptoms quickly disappeared; and one month later, when the gastroscopic examination was repeated, the pylorus was found to be contracting and relaxing quite normally, and normal peristaltic waves were once more observed in the antrum.

Apart from some undue laxity of the pylorus, the physiological duodenal reflux has been observed only twice, perhaps because it has not always been sought.

Another case of passing interest was that of a man with duodenal ulcer who also suffered from anginal attacks; the passage of the gastroscope resulted in the production of a mild attack of angina.

I prefer for obvious reasons to attribute this result to the dilatation of the œsophagus rather than to the psychical effect of the gastroscopic examination.

Œsophageal varices were suspected on one occasion when some resistance to the passage of the stomach tube was felt near the cardiac orifice and bleeding was noticed on its withdrawal; the examination was not continued.

In another case, in which the radiologist had reported "a gastric ulcer on the lesser curvature near the pylorus", a small opening was seen without any visible base, suggesting the possibility of a diverticulum.

The remaining cases to be mentioned are five cases of carcinoma and one case of tuberculosis.

The first patient with carcinoma was a male, aged fifty-two years, who had complained of epigastric pain of nine months' duration and of the loss of one and a half stone in weight in the same period. Six years previously his abdomen had been injured in a motor car accident. Twenty years previously he had pleurisy with effusion.

Radiographic examination of the chest revealed chronic tuberculosis of the apices of both lungs. Radiographic examination of the stomach and duodenum revealed no organic lesion. Examination after a fractional test meal revealed achlorhydria. The gastroscopic findings were as follows:

> Slight inflation with air caused distressing pain referred to the epigastrium. An area of greyish mucosa was seen in the incisural region with marked rigidity of the wall.

A diagnosis of infiltrating carcinoma of the prepyloric region was made.

At operation by Dr. Perry ascites was found to be present. A hard saddle-shaped mass was present on the

peritoneal surface of the lesser curvature of the stomach in the situation indicated gastroscopically. An omental gland removed was found to be widely infiltrated by a mucoid (colloid) carcinoma. The primary source of this metastasis was thought to be suprarenal.

The second patient with carcinoma was a man, aged fifty-seven years, who complained of weakness and pallor of six weeks' duration, and of anorexia and flatulence of five months' duration, with the loss of one and a half stone in weight. X ray examination revealed an extreme degree of pyloric stenosis, probably secondary to a chronic ulcer. The Wassermann test applied to the blood elicited no reaction. The fæces gave a positive result to the benzidine test for occult blood. Examination after a fractional test meal revealed achlorhydria. Examination of the fasting stomach residue suggested "gastric carcinoma". Gastroscopic examination proved rather difficult owing to the presence of loose and septic teeth. Four hours previously the patient's stomach had been emptied by a tube. Ten ounces of foul-smelling gastric juice with old blood were now removed. A quick view of the mucosa revealed an absence of folds and rigidity near the antrum; the mucosa had the appearance of atrophic gastritis, with a mass, white and glistening, on the lesser curvature and posterior wall near the incisura. The mass seemed to project into the lumen and to be circumscribed. The examination had to be rapidly completed.

A diagnosis of carcinoma of the lesser curvature and posterior wall with atrophic gastritis was made.

At operation by Dr. H. R. G. Poate a carcinoma involving the pylorus and glands near the pylorus and extending back to the posterior abdominal wall was found. Metastases were found on the liver. Gastro-enterostomy was performed.

The third patient with carcinoma was a woman, aged forty-seven years, who had suffered for fifteen years from flatulence, pain after food and vomiting. X ray examination of the stomch, duodenum and gall-bladder revealed no abnormality. The Wassermann test as applied to the blood elicited no reaction. Examination after one fractional test meal appeared to give normal results; but a second revealed hypoacidity. Gastroscopic examination revealed a most pronounced pulsation in the stomach. The incisura was seen once only, at the beginning of the examination—a most unusual occurrence. A condition of severe atrophic gastritis was present in the mucosa of the body; the mucosa was greyish, with visible vessels and hæmorrhages. In addition, a mass was seen on the greater curvature proximal to the incisura, with a defined margin on one side. Examination was very difficult owing to the marked pulsation and the almost complete obstruction of the objective at intervals.

A diagnosis of tumour of the greater curvature, possibly simple in character, with atrophic gastritis, was made.

At operation by Dr. Poate a neoplasm of the greater curvature about midway between the pylorus and fundus, roughly one and a half inches in diameter, was found. Mobile glands, hard and shotty, were found along the free border of the lesser omentum. Partial gastrectomy and posterior gastro-enterostomy were performed.

The fourth patient with carcinoma was a woman, aged seventy years. This patient complained of "dyspepsia", epigastric pain and vomiting after meals for a period of three years. In the earlier days of her complaint at least, the pain, dull and aching in character, had been relieved by alkalis. Six months after the onset of her symptoms she apparently had a cholecystectomy performed for gall-stones. Two months prior to gastroscopic examination a fractional test meal examination revealed a normal secretion of free hydrochloric acid. One month later a condition of complete achlorhydria and total hypoacidity was found. This achlorhydria was later found to be refractory to histamine stimulation.

An X ray examination one week before gastroscopic examination revealed "about three-quarters (six hours) gastric residue. Also marked irregularity of the pylorus suggesting organic obstruction, probably new growth."

Gastroscopic examination revealed a large mass projecting into the stomach lumen at the level of the incisura and occluding the view of the pyloric antrum. Atrophic gastritis of the body was present to a considerable degree, as evidenced by greyish mucosa, small folds, visible submucosal vessels *et cetera*.

Repeated examinations in a case of this kind might have provided us with evidence of the ulcer-cancer sequence. Owing to the age and condition of the patient no operative findings, confirmatory or otherwise, are available in this case.

The fifth patient with carcinoma was a woman, aged fifty-nine years. She complained of epigastric pain of six months' duration and of tiredness and weakness. Her appetite was good and apparently she had lost no weight. X ray examination revealed a filling defect in the pre-pyloric region of the stomach, and malignant disease could not be excluded. Examination after a fractional test meal revealed achlorhydria and total hypoacidity. The Wassermann test elicited no reaction when applied to the blood, and, incidentally, an electrocardiogram revealed the presence of auricular fibrillation.

The gastroscopic findings were as follows. The body mucosa was very pale with visible submucosal vessels. The walls of the pyloric antrum appeared to be the site of an infiltrating type of neoplasm, almost certainly carcinoma. The lumen of the antrum was encroached upon and the surrounding walls were rigid. At the junction of the anterior wall and incisura there appeared a probable neoplastic projection with a tendency to hæmorrhage. The growth appeared demarcated proximally from the body mucosa.

Whether the growth is adherent to the pancreas or elsewhere cannot be decided; operation has not yet been performed.

The final case deserving of detailed mention was that of tuberculosis of the stomach. This case will be reported fully by Dr. Howard Bullock, to whom I am indebted for permission to mention it. I am also grateful to Dame Constance D'Arcy for referring the patient to me for examination.

Discussion.

To draw conclusions from so few examinations would not appear wise; perhaps it would be better to say that certain suggestions seem to arise from them.

The final word in the diagnosis of gastritis seems to be in the province of the gastroscopist and not in that of the radiologist. The same remark naturally applies to ulceration of gastritic origin. True peptic ulceration seems in a different category; perhaps the suggestion that ulcers of a more superficial character appear more amenable to diagnosis by gastroscopy would suffice for the present.

Even from the few cases of carcinomata reported, it can be seen that gastroscopy may prove of considerable assistance in the diagnosis of the condition. In the first three cases rather negative findings were obtained radiologically, though the diagnosis of carcinoma was confirmed subsequently at operation in each of these cases. In the fourth and fifth cases more positive findings were obtained radiologically. In four of the five cases signs of atrophic gastritis were discovered gastroscopically.

In four of the five cases also achlorhydria was discovered on examination after a fractional test meal, and in the fifth case a condition of hypoacidity was also found.

The lesion in the case of tuberculosis of the stomach was discovered both radiologically and gastroscopically; but the diagnosis was reserved for the pathologist.

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In addition I am indebted to Dr. Poate for permission to report the second, third and fifth cases of carcinoma, to Dr. Perry for permission to report the first case, and to Dr. Money for the fourth case.

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Reports of Cases.

FOUR EXAMPLES OF INIENCEPHALUS, WITH A STATISTICAL REVIEW OF THE LITERATURE.[1]

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"TRÈS CURIEUX" was the epithet which Isidore Saint-Hilaire applied to the abnormality known as iniencephaly. According to Ballantyne, Saint-Hilaire was the first to name and describe this condition a little more than 100 years ago, though Ballantyne doubted whether the incidence was as rare as represented by the French teratologist, basing his conclusion on the fact that he had met with seven specimens up to the year 1904.

Lewis(1) was able to collect reports of 22 cases in 1897, and added details of three others, while the number had grown to 38 when Dorland(2) reported an example in 1925.

In this contribution the total has been increased to 57, four specimens, three from the collection in the department of obstetrics and one from the collection of the department of anatomy in the University of Sydney, being discussed mainly from the morphological standpoint. A coincident study, involving the histology of the endocrines, is being completed and will be published at a later date.

One of the four specimens now reported arouses additional interest because of an unusual linking of gross fœtal pathology with obstetrics. Theoretically it might be conceived that the retroflexed attitude of the fœtus could be a cause of difficult labour; but usually this does not occur, as is shown in Table I. In the clinical account of the delivery of Specimen 104 (which incidentally was a male, a very uncommon happening) a series of events, commencing with a breech presentation, eventually terminated in the death of the mother. The relation of the abnormality to the cause of the death cannot be conclusively established, yet is extremely suggestive.

The chief characters of iniencephaly comprise retroflexion, *spina bifida* and a bony defect of the occiput in the vicinity of the *foramen magnum*. The range of defects which may accompany these abnormalities is very varied, but some appear to be more frequently present than others. Following are the details of the four specimens; a tabulation of important data concerning the 57 cases follows, together with some discussion arising out of an analysis of these. References to the literature are also given.

Specimen 77.

Specimen 77 is a female and belongs to the collection of the department of obstetrics, University of Sydney. The clinical notes give the following information. The mother was in her early thirties and had had two previous confinements. The infant was full time and there was no difficulty in delivery. The mother has had several normal pregnancies since the abnormal one. The skin, hair and nails are normal, and there is no external indication of a *spina bifida*. When the body is placed in an erect posture the eyes are directed upward and the ears assume a horizontal disposition. The latter are symmetrical, but the general pattern is not clearly marked. In front of the left ear a small papule lies anterior and superior to the tragus. In other respects the face is normal. The position of the chin is defined by a slight crescentic groove and the neck is vaguely suggested. Neither the suprasternal notch nor the clavicular prominences appear on the surface, which below this region bears an interpectoral linear indentation, reaching almost to the upper margin of the epigastrium. The umbilical cord appears to be normal, and inferior to it lie the vulva and anus, looking downward and backward respectively. Bilateral *talipes equino-varus* is present, while the only manifest abnormality of the superior extremities is that the backs of the hands are directed anteriorly.

FIGURE I.
Specimen 77. Lateral view.

Dissection of the thoracic and abdominal viscera discloses the following abnormalities. The right lung has two lobes, the interlobar space being vertical. Below an intact diaphragm the cæcum lies in an oblique plane with the proximal end pointing toward the left iliac fossa. The kidneys, normal in size, are nearly twice as large as the suprarenals (an abnormal ratio) and their uretero-pelvic junctions are level with the promontory of the sacrum.

[1] This investigation was carried out at the department of pathology, University of Sydney, in 1938, with the aid of a grant from the National Health and Medical Research Council.

TABLE I.

Reported by.	Sex.	Foetal Age in Months.	Associated Abnormalities.	Mother's Age.	Number of Pregnancies.	Obstetrical Notes.
Fleck[1]	F.	—	Complete *spina bifida*; wide opening in occiput.	—	—	—
Hutchinson[1]	M.	—	Hydrocephalus; *spina bifida*; bilateral talipes.	—	—	—
Coffin[1]	F.	8	No sternum or coccyx; many spinal bones missing.	—	—	Footling presentation; lived one and a half hours; mother in labour 24 hours; hydramnios.
Yocum[1]	—	9	—	—	—	Face presentation; mother died.
Landucci[1]	F.	? 9	Spinal column open to T 12; *spina bifida* L 4, 5; S 1.	—	—	Hydramnios.
Ballantyne[1]	F.	? 7	—	31	4	Footling presentation; difficult extraction; hydramnios; first child had a *spina bifida*.
Ballantyne[1]	F.	? 6	Diaphragmatic hernia; complete *spina bifida*.	—	—	—
Lewis[1]	M.	5½	*Spina bifida* to L 2.	25	1	Uniovular twin; footling presentation.
Lewis[1]	F.	9	*Spina bifida*; bilateral talipes; gastroschisis.	—	—	—
Duges[1]	—	—	*Spina bifida*; left diaphragmatic hernia.	—	—	—
Potthoff[1]	F.	—	Complete *spina bifida*; gastroschisis.	—	—	—
Cruveilhier[1]	F.	—	Anterior and posterior *spina bifida*; left diaphragmatic hernia; melioschisis.	35	3	Vertex presentation; normal birth.
Drew[1]	F.	8½	Complete *spina bifida*; bilateral talipes.	—	—	Vertex presentation; lived half an hour.
Lawther[1]	F.	8	Absence of cervical vertebræ; diaphragm, œsophagus, stomach ended blindly.	40	1	Marginal placenta; podalic delivery; cord four inches long.
Vernier[1]	—	6	*Spina bifida*; cyclopia; bilateral talipes.	21	1	Hydramnios.
Remfrey[1]	F.	9	Complete *spina bifida*; unusual origin *gluteus maximus*.	—	—	Breech presentation; podalic extraction; cord two inches long broke.
Lewis[1]	F.	? 7	Complete *spina bifida*; bilateral talipes.	—	—	—
Hull[1]	—	—	*Spina bifida*; talipes.	—	—	—
Gros[1]	—	—	*Spina bifida*; no occiput.	40	1	—
Budin[1]	F.	9	—	24	1	—
Rogers[1]	—	9	Some vertebræ absent; anus imperforate.	22	4	Live birth; hydramnios.
Bonnaire[1]	—	9	Anterior and posterior *spina bifida*.	—	2	Binovular twin; breech presentation; respired; dropsy of amnion.
Burton[2]	F.	8	*Spina bifida*; hare-lip; umbilical hernia; webbed feet.	22	1	Hydramnios.
Abbott and Lockhart[3] ..	F.	—	*Spina bifida*; left talipes; abnormal ears.	—	—	—
Abbott and Lockhart[3] ..	F.	9	Bilateral talipes; umbilical hernia.	—	—	Mother syphilitic.
Abbott and Lockhart[3] ..	M.	? 9	*Spina bifida*; bilateral talipes; horse-shoe kidney; one artery absent in umbilical cord.	27	2	Vertex presentation; normal delivery.
Hunziker[3]	F.	? 7	*Spina bifida*; hydrocephalus.	33	1	Breech presentation; spontaneous delivery; 12 hours' labour.
Vallois[3]	—	—	*Spina bifida*	—	—	—
Wheeler[3]	F.	9	Defective occiput; deformed ears; hypertrichosis.	—	—	Spontaneous birth; lived a few hours.
Michel[3]	F.	8	Right *pes varus*; absence of diaphragm; *situs inversus* of viscera.	40	6	Spontaneous; adherent placenta.
Hayes[3]	F.	9	*Spina bifida*; diaphragmatic hernia; hydrocephalus.	—	—	—
Serbin[3]	F.	6	—	31	2	Spontaneous; adherent placenta.
Hirst[3]	—	—	—	—	—	—
Bartelmez[3]	F.	9	*Spina bifida*	—	—	—
Ballantyne[4]	—	—	—	—	—	—
Ballantyne[5]	F.	6½	—	42	10	—
Ballantyne[5]	—	—	—	—	—	Labour prolonged.
Ballantyne[6]	F.	8	*Spina bifida*; left talipes; diaphragmatic hernia.	35	6	Hydramnios.
Ballantyne[6]	M.	? 7	*Spina bifida*.	—	2	—

TABLE I.—*Continued.*

Reported by.	Sex.	Fœtal Age in Months.	Associated Abnormalities.	Mother's Age.	Number of Pregnancies.	Obstetrical Notes.
Dorland[2]	F.	9	*Spina bifida.*	32	1	Chin presentation; craniotomy; uterus inverted.
Napier[3]	—	7	*Spina bifida*; occipital defect; supra-umbilical sac contained viscera; cleft palate; right talipes.	—	—	—
Strachan[3]	F.	9	No *spina bifida*; left diaphragmatic hernia.	26	3	Normal labour.
Guess[4]	F.	6½	*Spina bifida*; no occipital defect; bilateral *talipes varus.*	31	1	—
Weis and Lieberman[5]	F.	9	*Spina bifida*; umbilical hernia; polycystic kidneys.	—	11	Footling presentation; mother exsanguinated.
Dreyfuss[6]	F.	? 7	*Spina bifida*; left talipes; polycystic kidneys; dislocations of shoulder and hips.	30	1	Breech presentation; extraction.
Bear[7]	F.	? 7	*Spina bifida*; absence of occiput; left diaphragmatic hernia.	20	1	—
Kornfeld[8]	F.	—	*Spina bifida*; bilateral *talipes equino-varus*; meliocschisis; no cerebellum or ventricular system; imperforate anus and vulva.	28	4	Cæsarean section.
Howkins and Lawrie[10]	F.	7½	*Spina bifida*; occipital defect; fused thoracic vertebræ.	24	1	Hydramnios; face presentation; normal labour.
Howkins and Lawrie[10]	F.	7½	*Spina bifida*; umbilical hernia; right talipes.	38	1	Hydramnios; breech presentation; normal labour.
Howkins and Lawrie[10]	F.	9	*Spina bifida*; bilateral talipes; umbilical hernia.	35	3	Face presentation; lived 39 hours; normal labour.
Howkins and Lawrie[10]	F.	7	—	—	—	Spontaneous delivery.
Howkins and Lawrie[10]	F.	? 7	—	—	—	—
Howkins and Lawrie[10]	F.	? 7	—	—	—	—
Brodsky	F.	? 9	*Spina bifida*; occipital defect; left diaphragmatic hernia with limiting sac.	—	—	—
Brodsky	F.	? 9	*Spina bifida*; occipital defect; hydrocephalus; right diaphragmatic hernia; abnormal lungs.	—	—	—
Brodsky	F.	9	*Spina bifida*; no occipital defect; bilateral *talipes varus*; abnormal lung.	? 33	3	No difficulty in delivery.
Brodsky	M.	? 9	*Spina bifida*; hydrocephalus; abnormal mouth and ears; right diaphragmatic hernia.	28	2	Breech presentation; embryotomy; supravaginal hysterectomy; mother died from peritonitis.

Specimen 104.

Specimen 104 belongs to the collection of the department of obstetrics, University of Sydney. The following are the clinical notes.

Mrs. A., aged twenty-eight years, and in her second pregnancy, was admitted to the Royal Hospital for Women, Paddington, at 4 p.m. on July 14, 1923, in a condition of severe collapse. Labour pains had started at 6 a.m. on that day, and the breech presented. The breech and legs were born; but it had been impossible to deliver the body and head in spite of strong traction on the legs and perforation of the body and head. Parts of the head and soft tissues of the legs had been cut or torn off; nevertheless it was still found impossible to deliver the fœtus and so the patient was sent to hospital. She was in obvious pain, with contractions of the uterus recurring every thirty seconds. The contractions of the uterus stood out prominently. Supravaginal hysterectomy was performed and the fœtus was removed. A perineal tear, which did not involve the rectum, was repaired and the patient left the operating theatre in good condition. Peritonitis supervened and the patient died on July 20, 1923.

The specimen, a male, is lacerated and portions of limbs are missing. The skin, hair and nails are normal. The face, however, displays many abnormalities. Though symmetrically placed, the ears are crumpled like a sow's ears and are deficient in general pattern. On the right side there is an accessory tragus, and beside it, at its postero-superior margin, is a sinus along which a probe may be inserted for four millimetres. Two accessory traguses are present on the left side. The nose is slightly flattened and deflected to the left; but these defects may

FIGURE II.
Specimen 104. Lateral view.

be due to compression against a jar. Outstanding as a grotesque feature is the mouth, the outer angles of which have been depressed, the creasing extending into the

cheeks, as if a tightly drawn string has been tied at the level of the mouth. The chin is poorly represented and has a median dimple, while the neck is remotely suggested by a faint groove which is prolonged forward from behind the ears. The line of the clavicles and the suprasternal notch are absent, and between the pectoral regions there is a vertical crease, which disappears above the umbilicus. Although the effects of embryotomy are very noticeable, the penis and scrotum have escaped mutilation. No other details of the external appearances are worthy of record except that the backs of the hands face anteriorly and that the bones of the head are separated, the scalp being thrown into folds.

Internally the suprarenals and kidneys are in their accustomed positions, the ratio in size being 1:2. No trace of gut can be found below the diaphragm. The domes of the diaphragm are intact; but the œsophageal opening is very wide, and through it abdominal viscera have been permitted to pass into the right side of the thoracic cavity. Indeed it seems that the spleen, having entered this portal, came to occupy a position to the left of the mid-line, a fine investing membrane separating it from the heart. The stomach, duodenum and pancreas are sharing the left side with the left lung. Gut below the level of the duodenum has been eviscerated.

FIGURE III.
Specimen 104. Showing the abnormal mouth.

Specimen 178.

Specimen 178, a female, belongs to the collection of the department of obstetrics, University of Sydney. On external inspection the head is seen to be large, with corrugation of the scalp. Palpation reveals a separation of the cranial bones and a large deficiency in the occipital region. Abnormality of the head is otherwise limited to a small mouth and a folded left ear. The pattern of both ears is not as well marked as usual. A crescentic groove marks the position of the chin, yet the neck is absent, the contour here being convex. The suprasternal notch and the clavicles are not represented on the surface. An interpectoral groove is present. The vulval cleft is facing downwards and forward, and behind it the anus is directed backward. When the abdomen was opened the liver was the only organ visible, and very little is seen of the normal contents of the abdomen when the liver is displaced upwards.

The œsophageal opening is larger than normal and provides a clue of the whereabouts of the missing organs. Above the level of the œsophageal opening, and inside the thorax, is the appendix. The caecum and the lower part of the ileum lie twisted in a volvulus, while most of the small bowel takes shelter behind the stomach, which is attached to a short œsophagus. As an entity the pylorus is not recognizable and small bowel of narrow bore proceeds distally. A diverticulum four centimetres long projects from the main trunk of the bowel about four centimetres below the distal end of the stomach, and near the termination of the diverticulum a fibrous strand suggests the remnant of the vitello-intestinal duct. Actually the diverticulum is closer to the stomach than to the ileocaecal junction. The spleen nestles in a little bay which extends into the left side of the thoracic cavity. No abnormality of the heart is seen, but both lungs possess a smaller quota of lobes than usual, the left consisting of one lobe and the right of two; the interlobar space stands vertically. All other organs appear normal.

FIGURE IV.
Specimen 178. Lateral view.

Specimen G314.

No clinical notes are available of Specimen G314, a female, which forms part of the collection of the department of anatomy, University of Sydney.

The hair and nails are normal and the skin is unblemished, except near the inferior margin of a bony defect in the occipital region. An ovoid greyish sac, measuring five centimetres in length, contains brain tissue, which can be seen through a thin transparent area. At the periphery of the sac the skin is a bluish-grey, and overlies a palpable bifid condition of the spinal column. The sole abnormality of the face is found on the lips, which are rough, the roughness being due to a large number of minute papillæ of a filiform type. The chin is shown by a groove. Hunching of the shoulders permits a modified neck to be made out in addition to producing a vertical groove between the pectoral regions. Notching cannot be seen in the suprasternal area. The umbilical cord and its components appear normal. The vulva and anus occupy the positions customarily found in this type of abnormality.

The thoracic contents are normal, though the diaphragm, on the left side, is eventrated. The eventration is through the tendinous area, and the thin expansion accommodates the spleen. The remainder of the abdominal viscera are normal in structure and, with two exceptions, in position. The exceptions refer to the caecum, which is horizontal and

just below the umbilicus, and the suprarenals, which on both sides lie on the anterior surfaces of the kidneys.

Radiographs were made of the four specimens. Two (numbers 104 and 178) were hydrocephalic, the cranial bones being widely separated. In number 77 complete *spina bifida* seems to be present. Dorland quotes Schwalbe as stating that "it is very rare to find all the vertebral neural arches ununited". *Spina bifida* of the thoraco-cervical region can be seen in the others (numbers 178 and G314). All four demonstrate departures from the normal spinal curves.

FIGURE V.

Specimen G314. Lateral view. Note the sac at the angle between the head and back.

The Literature.

In addition to the details recorded above the figures in Table II are of interest. Text-book measurements are given for comparison.

All specimens are shorter and lighter than normal. Of the various diameters of the fœtal skulls, both the submento-bregmatic and the occipito-frontal are increased in all specimens. In three there is a biparietal diameter greater than normal; but in general the other transverse measurements are less than normal. From the above figures it might be surmised that the iniencephalic skull is more likely to cause difficulty in delivery than the trunk. Actually this conjecture is not borne out by the available statistical data.

Specimen 104 shares with one other specimen the invidious distinction of being a factor in the death of the mother, the cause of the impaction appearing to lie in the abnormal thickness of the antero-posterior diameter of the chest. At the level of the point of union of the head with the back, this diameter is 13 centimetres, which exceeds the normal measurement of the static pelvis (and consequently the dynamic pelvis) in the antero-posterior, oblique and transverse diameters, at the brim, cavity and outlet.

What are the facts disclosed in a review of the 57 cases, including the four reported in this contribution?

The sex incidence is as follows:

Females	40
Males	5
Unspecified	12

The stages of development range from six months to full time. In only 25 instances are the mothers' ages recorded; the youngest was twenty-one and the oldest forty-two years of age. The age grouping is as follows:

Twenty-one to twenty-five years	6
Twenty-six to thirty years	5
Thirty-one to thirty-five years	9
Thirty-six to forty years	4
Forty-one to forty-five years	1

The number of pregnancies has a wide range, extending from one to eleven. In 11 of the 29 cases in which the number of pregnancies is stated, the mother was a *primipara*, the ages varying between twenty and forty years. On nine occasions hydramnios has been coexistent.

The presentations were as follows: breech, 6; footling, 4; vertex, 4; face, 3; chin, 1.

Two mothers died; the presentations in these cases were by the face and by the breech. One fœtus was removed by Cæsarean section. A correct antenatal diagnosis followed by Cæsarean section might have saved the life of one of the mothers who died. In two cases the placenta was adherent and in another the cord broke.

With regard to the fœtuses, one was a binovular twin and another uniovular. Five lived for short periods. The absence of *spina bifida* was specifically mentioned in one report, and hydrocephalus was present in five specimens. Talipes was the most constantly associated abnormality, occurring in 18 of the cases; a diaphragmatic hernia was found in 10 cases, and twice the diaphragm was absent. More than 20 other grossly abnormal features have been known to accompany the principal distinguishing characteristics.

Apparently Dorland's specimen is the heaviest yet recorded. It weighed 4,252 grammes (nine pounds six ounces) after craniotomy.

In only one instance has a related abnormality (*spina bifida*) occurred in another member of the same family.

The cause of the condition is unknown.

Acknowledgements.

Thanks are offered to the department of obstetrics and to the department of anatomy for the loan of the specimens; to Mr. Woodward Smith and Mr. Jamieson for the photography and radiography respectively; to Dr. Anderson-Stuart for assistance in radiographic interpretation; and to the Fisher Library for aid in collecting the literature.

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(2) W. A. N. Dorland: "Iniencephalus: A Cause of Extreme Dystocia", *Surgery, Gynecology and Obstetrics*, Volume XLI, Number 2, August, 1925, page 180.

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TABLE II.

Specimen.	Normal.	77	104	178	G314
Sex	—	Female.	Male.	Female.	Female.
Weight	3,175·0 gms.	1,300·0 gms.	2,308·0 gms.	2,405·0 gms.	2,332·0 gms.
Length	48·0 cms.	30·7 cms.	24·0 cms.[1]	34·0 cms.	28·5 cms.
Submento-bregmatic	9·5 cms.	12·6 cms.	13·8 cms.	15·1 cms.	12·1 cms.
Occipito-frontal	11·25 cms.	12·0 cms.	13·4 cms.	13·0 cms.[2]	11·8 cms.
Head circumference	—	34·0 cms.	30·5 cms.	40·0 cms.	29·2 cms.
Glabella to point of fusion with back	—	11·1 cms.	12·8 cms.	13·0 cms.	10·1 cms.
Biparietal	9·5 cms.	10·1 cms.	10·3 cms.	11·7 cms.	8·2 cms.
Transverse of shoulders	12·0 cms.	11·5 cms.	10·95 cms.	11·6 cms.	10·9 cms.
Bitrochanteric	10·0 cms.	10·1 cms.	—	9·0 cms.	9·8 cms.
Anus to point of fusion of head and back	—	5·3 cms.	9·5 cms.	8·4 cms.	8·6 cms.

[1] Legs missing. [2] Estimated.

(46) J. D. Guess: "Iniencephalus: Case Report", *The Southern Medical Journal*, Volume XIX, February, 1926, page 136.

(47) W. E. Weis and B. L. Lieberman: "Iniencephalus, with Report of a Case", *American Journal of Obstetrics and Gynecology*, Volume XIII, 1927, page 134.

(48) M. Dreyfuss: "Iniencephalus: Report of Two Cases", *The Journal of Technical Methods*, March 12, 1929, page 154.

(49) J. Bear: "Iniencephalus, with Report of a Case", *American Journal of Obstetrics and Gynecology*, Volume XXII, 1931, page 429.

(50) M. Kornfeld: "Iniencephalus", *Lijecnicki vjesnik*, Volume LVI, 1934, page 160; abstracted in *Berichte über die gesamte Gynäkologie und Geburtshülfe*, Volume XXVIII, 1934, page 70.

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Reviews.

A MANUAL FOR SOCIAL WORKERS.

"MEDICAL INFORMATION FOR SOCIAL WORKERS" is edited by Dr. William Matthew Champion and is compiled from experience gained in his teaching of the subject at the School of Applied Social Sciences at Western Reserve University; its contributors are chosen from the Faculty of the University.[1]

Social service, as we are beginning to understand it, is a development of only the last few years and has come about because of an increasing realization of the part that economic insecurity and social maladjustment can play in the causation and aggravation of disease; so much of the best efforts of the physician have been brought to nought by these adverse factors.

The physician, the nurse and the social worker make up a triad each member of which is indispensable in the care of sick people, in the alleviation of their physical, mental and material afflictions, in the prevention of disease and in the betterment of the nation's health. The physician has been with us for centuries, the nurse but for a generation or two; the social worker has scarcely yet attained to recognition of her important status.

In an illuminating introduction and in preliminary chapters the editor develops and elaborates the spheres of influence of the social worker. To the patient she can interpret certain features of his disease, especially as to present and future outlook, and by sympathetic instruction she can implant in the patient's mind the placidity or resignation that comes with knowledge rather than the fear that is linked with ignorance. She can put the patient in touch with facilities for treatment and can help to adjust these adverse factors in the relations between the patient and his family, his employers and his environment that so militate against the success of his treatment. To the community at large, by dissemination of the knowledge of things medical, she can gradually bring an understanding of the cause and prevention of disease, with the certain faith that great reforms in matters of public health will come only if there is a widespread awareness of the significance of these things. Finally, the social worker can be of great value as liaison officer between physician and patient, especially in the correlation of the physician's treatment with the personal, family and economic status of the patient.

To carry out these functions sympathetically and efficiently the social worker must have in her equipment more than a superficial knowledge of disease processes. She must be *au fait* with the obvious and more easily discernible symptoms of many illnesses, with the etiology, the mode of acquirement, the transmission, treatment and prevention.

Under appropriate headings the author discusses each of these phases of disease with an approach to the subject suited to the social worker as distinct from the physician or nurse. Throughout, emphasis is laid on the practical application of the knowledge thus gained, especially in the provision of means whereby the patient can be helped in the adjustment of adverse conditions, economic and social.

The volume is clearly and pleasantly written, and the physician and surgeon will find in it much that is informative and useful.

[1] "Medical Information for Social Workers", edited by W. M. Champion, A.B., M.D.; 1938. London: Baillière, Tindall and Cox. Crown 8vo, pp. 540, with illustrations. Price: 15s. net.

CARDIO-VASCULAR DISEASES.

IN writing "Cardiovascular Diseases: Their Diagnosis and Treatment", David Scherf and Linn J. Boyd have added a useful volume of moderate size to the long list of publications on cardio-vascular conditions.[1]

The book, which has been based on careful clinical observation and experience gained in the teaching of students, should help greatly those students and practitioners who find it difficult to transfer the detailed information of standard text-books to the practical problem of the treatment of a patient suffering from a cardiac disability.

The authors have avoided the traditional method of recounting, in isolated compartments, the pathology, symptomatology and treatment of the various conditions of the heart and arteries. They have taken as the text for each chapter some clinical problem and elaborated it from the viewpoint of practical medicine.

They have regarded it as necessary in many instances to mention briefly the underlying morbid physiology of the condition in question, and for this purpose they assume a knowledge of physiology which is sometimes at variance with that commonly taught in this country. This does not detract from the value of the work, as it is not essential to their main idea of presenting a practical treatise.

The material used has been grouped in such a way as to show readily the problems of differential diagnosis which the authors' experience shows to be common. In particular the section on peripheral arterial disease gives a concise and critical account of the diagnosis and treatment based on personal experiences.

In the preface the authors explain the absence of any account of electrocardiography, their reason being that the electrocardiograph is frequently not available to the general practitioner. However, they do mention its value in certain conditions.

At the end of the book there are four chapters devoted to a consideration of methods of treatment available in cardio-vascular diseases. These include accounts of digitalis therapy, the use of morphine and diuretics, a discussion on antisyphilitic treatment and the value of diets.

A glance at the chapter headings, which include such titles as "Paroxysmal Nocturnal Dyspnœa", "Endocarditis", "The Heart in Hyperthyroidism", "Cardiac Neuroses", "Diseases of the Aorta", shows its value from the clinical viewpoint and also as a pleasant variant on the ordinary approach to the subject.

The few illustrations used to elucidate the text are clear and easily understood. An adequate index is included, but references to the sources of information are not given.

The authors and the publishers are to be congratulated on producing a valuable practical book, easily read, well set up, and pleasantly free from typographical errors. It will help practitioners and senior students, when dealing with the individual patient, to apply theoretical medicine in a practical manner.

[1] "Cardiovascular Diseases: Their Diagnosis and Treatment", by D. Scherf, M.D., and L. J. Boyd, M.D., F.A.C.P.; 1939. London: J. and A. Churchill Limited. Demy 8vo, pp. 470. Price: 21s. net.

The Medical Journal of Australia

SATURDAY, NOVEMBER 25, 1939.

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SYPHILIS.

IT has been said that tuberculosis, syphilis and alcoholism are perhaps the three major problems of public health. Of these three, tuberculosis has received the most attention, alcoholism the least. Health authorities and experts in preventive medicine can point with pride to all that has been done in recent years to lessen the ravages of tuberculosis. Nowadays a diagnosis of pulmonary tuberculosis does not carry with it a "sentence of death" as it did fifty years ago. This is due to a fuller understanding of its pathogenesis, to the care and attention given to sufferers, and to the elaboration of new methods of treatment, some of which were recently described in this journal by F. J. Colahan and A. M. Hutson. Progress has been made in the treatment of syphilis, but not to the same degree as in tuberculosis; it has been more halting, and for this several reasons may be given. This subject has been discussed in these pages on previous occasions; it is introduced again that mention may be made of a book by Dr. George M. Katsainos, which is remarkable chiefly for its title, "Syphilis and its Accomplices in Mischief: Society, the State and the Physician".[1]

On the cover of his book Katsainos has reproduced words of John Stuart Mill: "A person may cause evil to others not only by his actions but by his inaction, and in either case he is justly accountable to them for the injury." We do not propose to review this book, for to do so would involve a consideration of the history of both syphilis and gonorrhœa and of extensive classical literature referred to by the author; it would also lead to political arguments which are out of place in such a work. The author is disappointed in the attitude of those medical practitioners among whom he has worked; and if we may judge by the bitter remarks that he makes about certain reprehensible types of practitioner, he has been unfortunate in his experience. Some of his statements, however, present a point of view which may be salutary. He discusses the excesses and the licentiousness associated with the War of 1914 and states that the lawlessness which followed it corrupted all spheres of social life and shook the foundations of family, Church and State. To this the Pope assigned five causes: the unprecedented challenge thrown down to established authority, the unparalleled enmity developed among mankind, aversion to work, unquenchable thirst for pleasure as the only end of life, and gross materialism. Katsainos admits the truth of this contention, but states that unfortunately these factors are not the cause of the evil but its consequences. "The family, the church and the state are creations of man" and had their origins in the "Taboo". Katsainos sees society as a gross and vulgar tissue of falsehood, a bog of hypocrisy and mutual deceit, an arena of all the passions having no centre and no boundaries. "The dwelling of society contains three things: the toothless and withered grandmother, Society, herself; her only and cherished daughter Hypocrisy, and a charming grand-daughter, Prudery. The bodies of all three are covered with ulcers, whose filth and stench are neutralized by artificial means. The house itself

[1] "Syphilis and its Accomplices in Mischief: Society, The State and the Physician", by G. M. Katsainos, M.D.; 1939. Athens: Privately printed by the author. Demy 8vo, pp. 676.

is full of disorder; mud and dust are set in motion whenever a visitor enters unannounced." The law of the social world is not like the law of the universe, where the heavenly bodies are kept in their orbits by the universal law of the attraction of gravitation, physical and inviolable. The contravention of social laws is the easiest thing in the world. We do not propose to follow Katsainos through his arguments concerning the responsibility for the present state of what he calls the world's retrogression, for he takes the reader through political pathways to which we have already objected. We should, however, ask ourselves whether there is any truth in his contention that society, the State and the physician are banded together against the victim of syphilis—in other words, whether the victim of this spirochætal infection is being treated as a sick person, as a sufferer from tuberculosis is treated, or whether he is looked on as a social outcast because his disease has something to do with the organs of sex. Hypocrisy, Katsainos's daughter of Society, is so ingrained in human nature that we must be careful before we make reply.

There are many people today who hold that sexual freedom is admirable and necessary to mankind. Be that as it may, there is a great difference between freedom and licence; and licence without question is a large factor in the dissemination of syphilitic infection. Katsainos denies that charity is a remedy. "Charity is the daughter of that two-headed monster injustice and profiteering, sister of Hypocrisy and mother of laziness." Charity, he states, has in certain circumstances been beneficial, but it is not a cure—it is a palliative. Prevention is the only remedy. Katsainos holds that purification must start with the family and the school, and must end with the physician. We do not agree that the priest has outlived his usefulness, that he is a parasite and that his venture has become bankrupt. Any person who professes ideals and tries to live up to them can do something for the betterment of humanity—and who more than the priest? Our author pins his faith to education by the Press. "When the Press is moral it makes men moral, when it is noble it ennobles them, when philanthropic it humanizes them; vile it debases, evil it corrupts and deceitful it cheats and leads astray." He thinks that the Press needs to be reformed, for he states that its reformation must come from itself. If this is true of the Press, it is equally true of the men and women of the community. "The only safe and unerring measure against syphilis is self-control." While making this statement and while adding that "so-called preventive measures are alluring and deceitful", leading to contamination and even licentiousness, Katsainos holds that prostitution is a necessity for mankind. He does not state whether he would approve of preventive measures in prostitution. We can, however, uphold one of his contentions—that adequate hospital accommodation should be provided for the treatment of syphilitics, that hospitals should be within the reach of all, and that sufferers from venereal disease should be treated as patients, not as unclean; as sufferers and not as accursed; as contaminated, not as dishonoured; as unfortunate and not as objects of contempt.

In this short discussion perhaps little more has been achieved than direction of attention to the difficulty of this subject. Appeal must always be made to the highest qualities and sentiments of man. If this appeal is not successful, and since human nature is so complex it will very often not be, then some form of prevention should be obtainable. At the present time the nations are engaged in a life and death struggle and civilization as we know it is at the cross-roads. If man is to emerge from the present distress as a dignified being, he must, in his private as well as his national life, choose the better, though perhaps the more difficult, way.

Current Comment.

NORMAL BLOOD PRESSURE.

IT is generally recognized that among vascular diseases, that important group which is responsible for so high a proportion of premature death and invalidity, the condition inadequately described as hypertension is extremely common. Cabot stated in 1926 that hypertensive cardiac failure was more common than all other forms of heart disease put together. The growth of interest about hyper-

tension, in both lay and public circles, is not entirely salutary. Of course the introduction of the sphygmomanometer into routine medical examination has been of incalculable value, for it is an instrument of precision; but the just appraisal of its readings is not always easy, nor is the effect of a knowledge of such readings always good on the patient. We read of sidewalk blood pressure stands in some cities where the passer-by may receive in return for a small coin a card bearing his blood pressure readings in haply unintelligible millimetres of mercury. This is but a step beyond the picture not seldom seen in consulting rooms of the hypochondriac who has a dismal record of his systolic blood pressure readings entered in a notebook which he carries about with him for some obscure purpose. Fortunately the diastolic reading seems to have escaped popularity up to date. But for the moment we are not concerned with the correct psychological treatment of the patient in whom hypertension is discovered, nor shall we pursue the fascinating puzzle of hypertension in relation to renal disease. What is the "normal" blood pressure? Records of insurance examiners would indicate that the conventional figures with the equally conventional sliding scale for age are not correct, as they tend to put the normal too high, and other large series which have been carefully studied substantiate this belief.

S. C. Robinson and Marshall Brucer have just published an elaborate analysis of a statistical and clinical study of 11,383 persons with reference to the blood pressure readings.[1] Ranking with temperature and pulse records the blood pressure is even more important than these, since it gives an evaluation of physical state of much longer range. Robinson and Marshall remark that lately there has been a tendency to belittle the estimation of blood pressure. This is probably related to two facts, one the subconscious or conscious desire of doctors to allay anxieties aroused by Press and radio alarmists, not to mention pessimists who combine bridge with a lurid pathological discourse, and the other the knowledge that many persons are observed to live to good ages in spite of hyptertension. Robinson and Marshall at the outset of their survey correct certain common errors. "Essential" hypertension may be apparently symptomless, but after all so may pulmonary tuberculosis for a time. Actually it is not only a spasmodic or even organic disturbance merely of the peripheral arteriole bed: it affects the heart and kidneys at a relatively early stage and indeed involves more or less all the viscera. Fahr is quoted as concluding that nearly 75% of the so-called chronic "myocarditis" is due to hypertension. Though cardiac failure is the most usual morbid termination of hypertension renal disease is also inseparably bound up with it. In all we must agree with the authors when they quote Major that "the control of hypertension is one of the outstanding challenges of today". What then is the "normal" person from the point of view of vascular health? Here we exclude atheroma and atherosclerosis, while recognizing the important predisposing role played by hypertension, for we are concerned with knowing the criteria for normality when we use our sphygmomanometer. We can arrive at this only by correlating the subjective state of the individual, the physical findings, and the ascertained relationships of these data with average mortality rates. The last mentioned are important. Obviously even though a person with "somewhat raised" blood pressure may appear in all respects robust and well, we cannot with certainty class him as "normal". Robinson and Brucer point out that a study of such persons over a period of years shows that they are not normal. Then again average readings of a large number of persons cannot be taken to constitute normalcy; the fallacy lies in the number of hypertensives in the community, a figure placed by these authors as high as 40%. The figures accepted as normal have tended to drop for a number of years, though the ancient and incorrect formula "100 *plus* the age" still exerts its corrupting influence on modern thought. Most of the subjects of the present inquiry were examined for life insurance, and many of these were undergoing a periodic examination given *gratis* by an insurance company, a practice that might well be more generally followed. In arriving at what might be considered a normal figure, these workers rejected first all persons in whom the systolic reading was 140 millimetres or over and the diastolic 90, since opinion is unanimously against the acceptance of higher readings as normal. Intermittent changes in pressure and the effect of sex and age groups were also studied, and the mortality rate at different pressure levels was determined. Hay's dictum may here be quoted: "There is something dramatic and ominous in the steady diminution in the expectation of life accompanying a rise of blood pressure." Space forbids further discussion of details, but the authors' conclusions may be summarized thus.

The normal range of systolic blood pressure for men and women is from 90 to 120 millimetres of mercury and the diastolic range is 60 to 80. The blood pressure becomes stabilized at adolescence, rises slightly about the age of twenty years and should normally remain unchanged by age. It is in a continual state of flux, rising highest during the afternoon and being lowest in the early morning, but its daily and yearly variation does not exceed five to ten millimetres of mercury. Transient falls in blood pressure are unimportant if unaccompanied by symptoms, and indeed are an assurance against hypertension. Transient rises above the usual figure are, however, significant, and like moderate constant rises, often herald a state of hypertension. Once a pressure becomes established above 120 millimetres systolic and 80 diastolic, it is a sign of incipient hypertension and such persons are more likely to suffer from hypertensive cardiac disease. Lastly persons with a blood pressure below 120 millimetres systolic and 80 diastolic have the lowest mortality rate. Robinson and Brucer state clearly

[1] *Archives of Internal Medicine*, September, 1939.

that "hypotension" is neither a disease nor a disease entity. This statement, of course, refers to persons not suffering from a cachectic disease state; but it should be utterly impossible for a patient undergoing routine examination by a doctor to be told that he has "too low" a blood pressure. Any comment on a reading such as 105 or 100 systolic pressure with corresponding diastolic pressure in an otherwise healthy person should be purely by way of congratulation.

THE SELF-SELECTION OF DIETS BY YOUNG CHILDREN.

THERE have been a number of experiments made in the self-selection of diets by children, chiefly with regard to the treatment of young diabetics. Diabetic children have been found to select a reasonable diet in many cases, soon learning that their comfort and health are improved when the undesirable foods are treated with the respect they merit; and in a wider dietary sphere it is also found among adult diabetics than when carbohydrates are controlled and a reasonable ration of fat is indicated, the patient in most cases seems able to choose an appropriate amount of protein. But these experiments concern the unhealthy, or those whose tastes and desires are conditioned to some extent by an abnormal physical state. A different problem is to find out what will happen when a young child is allowed to select his own diet in accordance with the dictates of a rapidly growing body and the indeterminate whims of an expanding mind.

Clara M. Davis has investigated the behaviour of babies of six to eleven months of age who were during the weaning period allowed to choose their own food.[1] The list of foods used in this inquiry included water; milk, both sweet and sour; fruit; vegetables; cereals; meat; fish and glandular organs. All the hard foods were cut up finely or mashed, and most of the foods were cooked, though many of the fruits and some vegetables were also served raw. The feeding of babies with such a diet must have provided their nurses with some entertainment and not a few surprises. The method adopted was to serve representative portions of the dietary and in feeding the babies the nurse waited with ready spoon to fulfil the behests of the potential statesman, artist or dictator. When interest in a food was evinced, the nurse filled the spoon and waited for the avid mouth to open; she did not comment on the choice, nor did she correct faulty manners. When the child ceased to eat, usually in twenty minutes or so, the tray was removed. Study of the fifteen children concerned was continued over a period of six years, none being followed up for less than six months and most of them for from one to four and a half years. Certain points made by the author are worth quoting. She remarks that the annals of the healthy are not exciting, thus resembling the lives of the happy, a remark which recalls the phrase of one Shelley who referred to "that unrest which men miscall delight". All the babies had good appetites and throve well; laxatives were entirely unnecessary, and no serious illness occurred. One interesting event was an epidemic of glandular fever which affected all the infants simultaneously. Loss of appetite was a notable precursor of clinical infection and its recovery preceded all other signs of convalescence by twelve to twenty-four hours. During convalescence raw beef, carrots and beets were favourite foods. One of D. H. Lawrence's characters once remarked of such a meal: "What good things. How noble it looks!" But Clara Davis invokes the need of iron and protein and vitamins in such young patients, and leaves Freud out of the reckoning. The outcome of this dietary experiment, which involved the checking some of 36,000 diets, was to produce a body of happy vigorous children whose physique and behaviour are described as being of the highest standard. Analysis of the foods consumed showed the average daily Calories consumed followed the expected curves. The average distribution of food constituents was protein 17%, fat 35% and carbohydrate 48%. The proteins were in every case those of the highest biological value, derived from milk, eggs, liver, kidney and muscle meats. The vitamin requirements appeared to be ample. Some children took little milk for a long period, and no elaborate analysis of calcium and vitamin *D* was available for the other foods taken by these children; but radiological study of their bones showed good calcification. In certain cases the babies had rickets when admitted to the institution where they were cared for, but subsequent progress of these children was equally satisfactory with that of the others who started with no such handicap. In every case the radiologist commented on the excellent degree of bony nutrition found.

The author discusses the interpretation of her results and concludes that the selection of foods for children still remains where it was—in the hands of their elders. All the foods presented for choice were unimpeachable; she truly remarks that self-selection can have little, if any, value if the foods presented are inferior. The chief value of the experiments seems to be that the old conflict between appetite and nutritional requirements was simply resolved. These babies had no preconceived views concerning taste or smell or appearance of foods. There was no indication of "instinctive" choice; in fact they sampled not only the foods, but chewed hopefully the spoon, the dishes or the tray. But definite tastes soon became established. For the first few weeks each little Columbus explored the untried ocean of diets, but after this period he would settle down to a limited selection. Thus patterns

[1] *The Canadian Medical Association Journal*, September, 1939.

of selective appetite were evolved by sampling, at first at random and later conditioned by experience. The author does not see any evidence of an instinct pointing blindly to the good or bad in diet. As she remarks, not only children, but adults, have from time immemorial eaten poisonous plants and animals, and they can be saved from such errors only by the transmission and utilization of racial experience. It had been hoped that this research might have revealed some contrast of the behaviour of infants to natural and processed foods, but financial considerations made this impracticable. Finally, the author is not misled as to the power of children to select their own diets; it certainly worked well in this instance, but, as she justly admits, the children could hardly have erred seriously. This is perhaps the moral, and to it we might add that there would appear to be definite advantages in allowing the function of appetite to be exercised freely.

PROGNOSIS IN PULMONARY TUBERCULOSIS.

EXPERIENCE is the medical practitioner's most important guide in the prognosis of pulmonary tuberculosis: experience in the detection and interpretation of clinical signs of exacerbation or defervescence, experience in the examination of X ray films *et cetera*. The experienced medical attendant assesses all the available data. He will not allow his judgement to be formed on the result of any single test. But many medical practitioners have no opportunity of gaining this necessary experience. The evolution of some standard procedure as a special aid to prognosis would be welcomed by them. Also it should assist in the guidance of those who have a more intimate knowledge of the disease. R. M. Barton describes a procedure that he has found valuable in a large series of cases.[1] Briefly, it consists in the correlation of the red blood cell sedimentation rate with the differential leucocyte count according to Schilling. Barton stresses the need for practice in the making of the count. When the count is made only occasionally uniform results cannot be expected. After describing his method of making blood films, carrying out the Schilling count and estimating the erythrocyte sedimentation rate according to Westergren's technique, Barton points out that the information given respectively by the count and the sedimentation rate is not always identical, change in the proportion of stab cells (band forms) occurring earlier than change in the sedimentation rate. A means of obtaining a single figure from the results of these procedures is therefore desirable. Frimodt-Möller and Barton devised a method for the determination of what they have called a tuberculosis index. It "is made up by the addition of four factors, an increase in each of which is generally an adverse sign, and a decrease a favourable sign". The four factors are the difference between the percentage of neutrophile leucocytes and the percentage of lymphocytes ($N - L$), the difference between the percentages of monocytes and lymphocytes ($M - L$), the percentage of neutrophile cells that are immature $\left(\frac{Stab}{N} \times 100\right)$ and the fall *per centum* in the column of red cells in the Westergren tube in one hour $\left(\frac{SR}{2}\right)$. The formula then reads as follows:

$$(N - L) + (M - L) + \left(\frac{Stab}{N} \times 100\right) + \frac{SR}{2}$$

or, more simply:

$$N + M + \left(\frac{Stab}{N} \times 100\right) + \frac{SR}{2} - 2L$$

Barton gives the normal range as from -20 to $+20$. A figure as high as 250 may be obtained in very advanced tuberculosis. If the percentage of neutrophile cells is 42, of stab cells 16, of lymphocytes 39·5, and of monocytes 5·5, and the sedimentation rate is 8 millimetres per hour, the tuberculosis index will be: $42 + 5{\cdot}5 + \frac{16}{42} \times 100 + \frac{8}{2} - 39{\cdot}5 \times 2 = 10{\cdot}6$, or for practical purposes, 11. Barton states that the index alters before any change can be detected clinically or by X rays; but he is careful to point out that it should not be solely relied on; it should be used as an aid to prognosis, along with the other available methods of examination.

This procedure is worthy of investigation in other countries. It would be of interest to observe whether it would be as valuable a guide to prognosis in a place where tuberculosis is perhaps an older disease and apt to follow a less acute course than in the cases observed by Barton. At any rate it is the product of a unique conception and as such commands attention. Its clinical application might add considerably to our knowledge of tuberculosis.

[1] *The Indian Medical Gazette*, September, 1939.

MANSLAUGHTER BY THE WITHDRAWAL OF INSULIN.

IN *The Journal of the American Medical Association* of September 30, 1939, there appears an interesting report of the trial of a "drugless healer" by the Supreme Court of Washington. The accused person withheld insulin from a diabetic patient who had consulted him, and also altered the patient's controlled carbohydrate diet. The patient died. It is stated in the report that to induce the patient to refrain from the use of insulin, which was necessary to preserve his life, is in principle the same as withholding the insulin by physical force. That a fresh trial was ordered because of a technicality in the waiving by the defendant of trial by jury when he had not admitted the truth of the charge, does not detract from the importance of the case. Those interested in medico-legal matters should read this report.

Abstracts from Current Medical Literature.

PÆDIATRICS.

Malignant Disease in Infancy and Childhood.

D. WILLIAM SCOTTI (*New York State Journal of Medicine*, June 15, 1939) has made a clinical and pathological survey of 64 consecutive cases of malignant disease in infants and older children. Of the cases, 72% were encountered during the first five years of life. Tumours of the kidney and adrenal led in the order of frequency, with those of the eye, bones, brain, retroperitoneal glands, mediastinum, liver, ovary, pharynx and thyreoid gland following in the order named. Wilms's type of kidney tumour was the commonest neoplasm in infancy and childhood. Such rare conditions as primary carcinoma of the kidney, thymus, and thyreoid, mediastinal teratoma, and cyst of the third ventricle with *pubertas præcox* in a female child are discussed. Of the 64 patients, 22 were lost to observation, and of the 42 known patients only five are known to be alive. Seven patients whose condition was clinically diagnosed as malignant were not included because of lack of pathological confirmation. The death rate must therefore be higher than that recorded. Since it has been demonstrated in this study, even though the number is small, and by others, that children can survive malignant disease if it is recognized early and radiotherapy is applied, either alone or combined with surgery, the disease should not be regarded as entirely hopeless. Another encouraging feature is the fact that such neoplasms as the Wilms's tumour of the kidney (the most common), endothelial myeloma, and carcinoma of the thyreoid are radio-sensitive. Recent advances in the application of radiotherapy and early recognition of the disease offer the best hope for decrease of the high mortality rate.

"Eumydrine" in Pyloric Stenosis.

H. ST. H. VERTUE (*Archives of Disease in Childhood*, June, 1939) gives an account of experience of the use of "Eumydrine" in the treatment of pyloric stenosis. In this condition there is an interference with the normal opening of the pylorus. Food leaves the stomach with difficulty and some of it is vomited. The pylorus is hypertrophied and may be palpable, and gastric peristalsis is visible. Atropine is known to be beneficial in relieving the spasm of the sphincter. "Eumydrine", chemically related to atropine, is much more successful, but the mode of action of neither drug is quite clear. "Eumydrine" was introduced by Svensgaard in 1935 in the treatment of pyloric stenosis. Sixty-one patients were treated, with controls. The immediate results were diminished period of vomiting, shortened stay in hospital and better increment in weight. In 1937 Braithwaite gave a brief report of twenty-two cases; the treatment was successful in eighteen cases, and four patients were relieved by surgery. The author's seven patients were seen at welfare centres and were consequently caught early and treated promptly. Six of the seven babies were breast fed. In not less than forty-eight hours vomiting had begun to diminish, the weight ceased to fall, pain grew less, and sleep and contentment took its place. No relapses occurred in any of the seven cases; there were no signs of toxicity and no after-effects of the illness. Reviewed at four months the patients appeared a perfectly normal set of children. The time spent in the wards was curtailed as experience was gained, and in the end two children were actually treated with success as out-patients. It is not contended, however, that operation may not still be required in severe cases, especially if the patients have escaped observation until too late. The dose of the drug was the same as that used by Svensgaard, namely, 0·25 milligramme given half an hour before each feed, dissolved in one drachm of water. Five feeds a day were given. The criteria of the disease were projectile vomiting, visible gastric peristalsis, constipation and loss of weight. Distinction between pyloric stenosis and pyloric spasm appears meaningless nowadays. Vomiting is abolished in most cases within seven days. The author concludes that "Eumydrine", which has a pronounced local and insignificant general effect, is a safe, rapid and successful remedy in pyloric stenosis.

The Ultimate Prognosis of Nephritis in Childhood.

JEAN M. CASS (*Archives of Disease in Childhood*, June, 1939) has investigated 120 children who were suffering from nephritis. The ultimate prognosis of acute nephritis in children has always been a subject of interest to the pædiatrician. The relative frequency of acute nephritis in children and the fact that many cases of renal failure in adult life cannot be explained, have led to repeated attempts to correlate the childhood illness with the adult renal failure. Until recent years and with traditional methods of examination these efforts have failed; but Addis gave clinicians a sign by which they can distinguish between those children who have fully recovered from acute nephritis and those who appear equally healthy but are actually in the latent stage of nephritis and will ultimately die of renal failure and its complications. The children in this investigation were subjected to a general clinical examination, including estimation of blood pressure, and the mother was given typed instructions for the collection of a twelve hours' specimen of urine for examination of the Addis method. The cases were grouped into healed, latent, active or terminal cases, according to the urinary findings and blood chemical findings. There were no changes in the plasma proteins which could be considered typical of any one stage of the disease, but the findings were abnormal in all the cases in the active or subacute stage. Eighty-eight patients with acute hæmorrhagic nephritis who were first admitted to hospital in the initial attack were examined six months to five years after the onset. The mortality rate in the acute attack was 3·4%. Of the patients, 32% were in the latent stage, and in 64% the condition was healed. The estimated ultimate mortality was 27%. The liability of the disease to become chronic was not affected by the removal of the apparent focus of infection (usually infected tonsils in the acute stage of the disease), nor was it related to the severity of the initial attack nor to the length of stay in bed or dietary treatment in the initial attack. Fourteen patients who were first seen in the active or subacute stage of nephritis were examined. The actual mortality rate was 50% and the probable ultimate mortality was at least 79%. Ten patients with nephritis of insidious onset have been examined. Four have recovered and the remaining six are unlikely to recover.

Plasma Prothrombin in New-Born Infants.

L. M. HELLMAN AND L. B. SHETTLES (*Bulletin of the Johns Hopkins Hospital*, July, 1939) have estimated the level of the prothrombin in the plasma of 18 mothers and 19 full-term normal infants, and have found average values of 102·5 and 22·2 units respectively. In marked contrast with the findings in normal term infants were the extremely low values observed in premature babies, the average value of the latter being 8·3 units. Preliminary studies indicated that the extremely low infant prothrombin levels could be raised by the giving of vitamin *K* to the mother prior to delivery or directly to the infant after birth.

Ureteral Transplantation in Infants.

THE usual age selected for transplantation of the ureters in children with vesical exstrophy is four to five years. C. C. Higgins (*Journal of Urology*, April, 1939) urges operation at a much earlier age and quotes seven patients under twelve months old operated upon successfully in one year. His technique consists in a two-stage procedure of the Coffey I type; but he lays stress on the importance of the preparation of the intestinal bed and of burying the ureter before it is actually inserted into the lumen of the bowel. The author's patients were singularly free from any post-operative complications, except one, who suffered evisceration after each operation. To combat this he now uses steel wire sutures for closure of

the abdominal wound. The reasons advanced for early operation are: (i) infants stand operation very well with less reaction than older children; (ii) every month increases the risk of recurrent renal infection and also the probability of dilatation of the lower one-third of the ureter; (iii) the organisms found in the colon in infancy are less virulent than in older children or adults; (iv) early operation permits normal physical and mental development.

ORTHOPÆDIC SURGERY.

Injuries of the Ligaments of the Knee Joint.

M. THOMAS HORWITZ (*Archives of Surgery*, May, 1939) discusses clinical findings in injuries of cruciate and collateral ligaments of the knee joint, and describes results of experiments on rabbits. There has been substantial clinical proof that the cruciate ligaments play a role secondary to that of the collateral ligaments in preservation of the stability and function of the knee joint. The author has shown by anatomical studies on the cadaver that the medial collateral ligament, especially through its anterior portion, which remains taut in flexion, efficiently checks internal rotation, antero-posterior motion and destruction of the tibia from the femur in the flexed knee, even in the absence of the cruciate ligaments. Both cruciate ligaments are most tense in flexion and internal rotation of the tibia on the femur. He suggests that the restoration of stability to severely traumatized knee joints by conservative measures is due rather to repair of associated tears of the collateral ligaments. Some authors have undertaken successfully the repair of collateral ligaments alone, disregarding the associated tears of the cruciate ligaments. Experimental work on rabbits supports the author's conclusions.

Adolescent Deformities of the Acetabulum.

JOHN GILMOUR (*The British Journal of Surgery*, July, 1939) discusses those acetabular deformities which are characterized by an increase in depth. Deep acetabulum is a minor grade of the primary deformity to be described, its main clinical significance being that it accounts for many of the adult hips which undergo spontaneous osteoarthritic degeneration in later years. It is possible to differentiate between protrusions of the acetabulum which are primary growth deformities, and those which are secondary to destructive disease of the hip or to trauma damaging the floor of the acetabulum. The secondary cases are essentially unilateral in incidence, and in the author's experience all have occurred in males. They show an irregular enlargement of the acetabular floor towards the pelvis, resulting in protrusion, there is some destruction of the femoral head in inflammatory cases, with shortening of the affected limb, and Shenton's line is interrupted. Primary protrusions are all related to the development of the bony pelvis, are commonly bilateral and preponderate in females. They show a marked tendency to osteoarthritic degeneration. They are to be recognized as an extreme degree of an acetabular deformity which is adolescent in onset and which is characterized by an increase in the depth of the acetabulum with associated changes in pelvimetry. Bilateral protrusions may vary in depth and in unilateral protrusions the opposite hip is always deeper than normal. Thus both are examples of a deformity which is essentially bilateral in incidence, though varying in degree. Pelvic asymmetry is always a feature when the degree of acetabular deformity is unequal on each side. Clinical signs are enumerated as limitation of hip movement, forward tilt of the pelvis, hyperlordosis of the lumbar part of the spine, stilted gait with prominent buttocks, and limitation of various minor movements of the lower limbs. Complications are osteoarthritis and aseptic bony ankylosis. Premature acceleration is advanced as the most likely explanation of the condition. Treatment is required for the limitation of hip movement and the secondary postural deformities, and consists in extension, manipulation, rest in bed or the application of a weight-bearing caliper. When these measures fail or when the articular surfaces have become irregular, ankylosis may be encouraged by a plaster of Paris spica, or the acetabuloplasty of Smith-Petersen may be used to improve movement.

Acute Staphylococcic Suppurative Arthritis.

ROBERT L. PRESTON (*The American Journal of Surgery*, April, 1939) states that the treatment of acute staphylococcic suppurative arthritis presents one of the most difficult problems in the entire field of medicine; massive necrosis, sequestration and chronic suppuration characterize this condition, in contrast with streptococcal and pneumococcal infections. Experimental work on rabbits showed that there were two types of staphylococcal infection, one characterized by extremely invasive local lesions, with multiple metastatic abscesses, and the other by mild non-invasive local lesions, but with pronounced toxic degeneration of the viscera. If treatment is to be effective it must be recognized that this condition is a systemic disease; treatment should be directed to the toxæmia and septicæmia as well as to the local condition. The local treatment consists in aspiration of the joint, which should be flushed with normal saline solution as often as it becomes distended, sometimes every eight hours. A specific bacteriophage is immediately prepared from cultures made at the first aspiration, and as soon as it is ready a quantity equal to one-half of the quantity of the aspirated pus is instilled into the joint. The joint is immobilized with a split plaster or traction and immobilization is continued until the inflammation has completely subsided. A bacteriophage given intravenously gives relative protection of the various organs from localization of the infective agent. Frequent small blood transfusions have, in the author's hands, been more efficient in controlling toxæmia than the commercial antitoxic sera; cevitamic acid is given in large doses, and ample fluids are given by mouth. When the temperature has been normal for ten days and there are no signs of localized inflammation, unrestricted motion of the joint is allowed for a few days. If there is no exacerbation, massage and cautious passive movement and, in the case of a weight-bearing joint, walking with crutches may be resumed. If the range of motion has not improved after three weeks and if X ray examination reveals no bony abnormality which would prevent motion, manipulation under anæsthesia is used, followed by massage and active and passive movements. The author reports a case and gives references to the literature.

Hereditary Deforming Chondrodysplasia.

CHARLES M. GRANEY (*The Journal of the American Medical Association*, May 20, 1939) reports ten cases of hereditary deforming chondrodysplasia occurring in one family. The condition has been defined as an "hereditary disturbance of bone growth beginning early in childhood and characterized by multiple cartilaginous growths within or on the skeletal system". "It is a retardation of normal transformation of cartilage into bone, and not primarily a bone tumour." Symptoms calling for treatment are deformity, pressure on nerves or tendons, or interference with the motion of joints. Pure cartilaginous or membra[illegible]us bone escapes the process, the bones most frequently involved being the ulna, fibula, femur, humerus and phalanges. Regression of the exostoses is noticed in some instances. The ætiology is obscure, but there is agreement that the condition is unrelated to rickets, vitamin deficiency, syphilis, tuberculosis or neoplasm. Theories of causation include: (*a*) impressions made on the germ plasm consequent to fractured bones and their complex healing process; (*b*) failure in adequate development of the periosteum, resulting in a failure of the cortex to attain full thickness, and failure of an inadequate periosteum to limit the growth of bone; (*c*) abnormal behaviour of the cells of the growth disk, and a failure of subperiosteal bone to keep pace.

Special Articles on Civilian War Casualties.

VIII.

POISON GAS AND THE EVOLUTION OF THE RESPIRATOR.[1]

WHEN on April 22, 1915, the Germans launched their first gas attack, a wave of indignation and horror swept around the allied nations. Part of this feeling arose no doubt from the fact that Germany, in 1900, had pledged herself at The Hague not to use projectiles whose only object was to give out suffocating or poisonous gases; but possibly the main cause of the resentment was due to the unpreparedness of the Allies and the success of the method. A new weapon invariably excites panic, protest and recrimination until the protester adopts and endeavours to improve the device. As Admiral Mahan, of the United States Navy, pointed out, the reproach of cruelty and perfidy had been directed against gunpowder and in later days against torpedoes, each being used by both sides after the element of surprise was over.

As a matter of historic fact, there was nothing new in the gas attack of April, 1915, except that the gas employed had been manufactured in chemical factories. "Smoking out" the enemy is a device as old as warfare. It was old in the Middle Ages, it was old in the Peloponnesian war in the fifth century B.C. It was used by Red Indians in intertribal fights and by them and against them in their contests with white men. After all, smoke is nothing more than a very effective chemical poison cloud. I am reminded of the vehement condemnation by many food reformers of the use of chemical preservatives in meat, despite the fact that they accepted as normal the smoking of the flesh of bird, beast and fish, which is nothing more than the addition of a combination of chemical preservative substances.

One undoubted fact of some interest seems to have escaped the notice of historians of poison gas, and that is the use of roasted Cayenne pepper by the Mayans of Central America as a weapon of war. Now capsaicin, the active principle in this smoke, renders air irrespirable in a concentration of one part in a hundred million, and this far exceeds the most potent poison gases evolved by the chemical ingenuity of the Germans or the Allies.

During the Crimean War, in 1855, Lord Dundonald suggested that sulphur dioxide produced by the combustion of sulphur could be used against the Russians. Like a true politician, Lord Palmerston recommended that the idea be put into action by Lord Dundonald himself; if it failed the Government would not be blamed, whereas if it succeeded, all the better for the Allies and all the worse for Russia. However, a committee appointed to report on the suggestion stated that no honourable combatant could descend to such a procedure, and ordered the destruction of the documents. Very probably this committee, with good British political sagacity, realized that any gain arising from the use in battle of sulphur dioxide would be nullified and more than nullified by the indignation it would excite amongst civilized peoples.

During the Boer War the distinguished chemist Sir William Ramsay advocated the use of acrolein in making enemy positions untenable without doing any physical damage to the sufferers. This suggestion was not taken seriously, though the British public learned that many Boers who had escaped injury from the explosions succumbed to the fumes of the picric acid shells with which they had been bombarded.

Despite these earlier attempts and proposals, there is general agreement that the history of gas in war begins in April, 1915, and that the first gas was chlorine, and that it was used by the Germans for the first time. The British retaliation in kind began on September 24 of the same year. From that time on it was, as the late Professor E. H. Starling observed, "a battle of wits", each side endeavouring to learn what the enemy was likely to use and so being prepared with an adequate absorbent, whilst at the same time trying hard to evolve a poison gas or vapour which would penetrate the enemy's defence. At first when chlorine was used the absorbent was a chemical substance or mixture of substances like soda-lime, which would chemically unite with and detoxicate the chlorine. Then, as other gases were employed, charcoal became the universal absorbent or rather adsorbent by virtue of its multiple adsorbing surface rather than on account of any chemical affinity. Much experimentation was carried out on the adsorbing efficacy of various types of charcoal, and many of the results of this have not yet been divulged. Then in this "battle of wits" a great forward step was taken when not a gas or vapour, but a cloud or smoke was used which charcoal retains imperfectly. It comes as a surprise to the young chemist to find, for example, that sulphuric acid in the form of cloud can be bubbled through strong alkali solution without appreciable absorption. The basis of the first poison smoke was diphenylchlorarsene, or "D.A.", which the Germans introduced, but, fortunately for the Allies, did not know how properly to employ. Much more efficient smoke candles were shortly afterwards designed by the British. The only type of respirator which will shield against smoke or cloud contains fibre pads presenting large trapping surfaces. This brings in the difficulty that the resistance to breathing is increased, and so the diameter of the absorbing box has to be enlarged. All respirators today have both special charcoal for gases and vapours and fibre pads for poison smokes.

Poison gas warfare entered into an entirely new phase in July, 1917, when the Germans used dichlor-ethyl-sulphide or mustard gas—$\frac{CH_2ClCH_2}{CH_2ClCH_2}>S$. Hitherto the gases employed produced inflammation of the breathing organs or a toxæmia through pulmonary absorption. But mustard gas is a poison which attacks living tissue, and on the skin, which has an enormously greater physical protective capacity than mucous membranes, it acts as a vesicant producing burns. Mustard gas was first prepared by Guthrie and by Niemann independently in 1859, and both described its blistering power; but it was reserved for the great organic chemist Victor Meyer (1886) to make a pure preparation and to describe its properties in full. Here one may parenthetically remark that chemists, ignorant of physiology or pharmacology, seem to live charmed lives, for they prepare and handle substances of devastating toxicity and rarely meet with accident. It is true that Emil Fischer suffered for years from phenylhydrazine poisoning, but that was exceptional. Anyhow, the dichlor-ethyl-sulphide of Victor Meyer remained a chemical curiosity until July, 1917, when, as stated, the War entered on a new phase, for mustard gas is persistent and penetrating and has no immediate warning effect. Whilst the charcoal respirator effectively absorbs mustard gas, the whole body has to be protected, and many fabrics, including rubber, are readily penetrated. Floors and walls can retain mustard gas and remain lethal for long periods. This has been recognized in the tactics of gas warfare, for a fortress or trench from which the enemy has been expelled by mustard gas cannot be occupied by the victor until laborious decontamination has been carried out. Further research is needed (but for all I know it may be completed) on the questions of quick detection of this agent, effective first aid when the skin has been attacked and rapid decontamination of floors, walls and fabrics. It may be predicted with confidence that if poison gas is to be used again in war, the floating agent will not be merely a respiratory irritant, or a mucous membrane irritant, or a toxic compound admitted to the circulation through the lungs, but a substance like mustard gas, perhaps more deadly, less detectable and with longer delayed effects. As it is, mustard gas is unfortunately only too efficient, as one part in 14,000,000 parts

[1] A lecture delivered under the auspices of the Melbourne Permanent Post-Graduate Committee on July 31, 1939.

of air will cause conjunctivitis and one in 5,000,000 will burn the skin. The oily character and small solubility in water make it difficult to remove by ordinary detergent means. Most effective in rendering it innocuous are oxidizing or chlorinating substances, and of these the simplest and cheapest is bleaching powder, the well known "chloride of lime".

Of the many arsenical preparations employed or suggested, perhaps the most important is "Lewisite", the "dew of death"—$Cl_2As(CH:CHCl)$—which was ready for use when the Armistice put an end to hostilities. Superior to the other arsenicals in that it burns the skin as well as attacking the mucous membranes, "Lewisite" has the drawback of possessing a strong and characteristic odour.

Classification of Poison Gases.

Many schemes of classification of poison gases have been suggested—some chemical, some based on their toxicology. The following represents a simple, though by no means comprehensive, grouping:

1. Respiratory irritants: chlorine, phosgene *et cetera*.

2. General or blood poisons: hydrocyanic acid, carbon monoxide, sulphuretted hydrogen. These proved a failure.

3. Lachrymatory gases: brom-benzyl-cyanide or "B.B.C", chlor-aceto-phenone or "C.A.P." and others. These are employed today only to quell riots or mutinies. At one time they were used to disguise lethal or respiratory gases, but the trick was soon detected.

4. Lachrymatory and respiratory gases: chloropicrin, brominated ethyl-methyl-ketone (the "Ethel" of the British troops), trichlormethylchloroformate.

5. Arsine smokes: diphenylchlorarsine or "D.A.", diphenylamine-chlorarsine or "D.M." and many kindred compounds.

6. Vesicants: dichlorethyl-sulphide or "mustard gas", dichlorarsine-vinylchloride or "Lewisite", cacodyl isocyanide and others more recent, about which considerable secrecy is maintained.

The Story of the Respirator.

The evolution of the respirator does not redound to the credit of the medical services of the belligerents. The earliest forms in the British army were cloths soaked in urine or bottles with the bottom knocked out and lined with moist earth held in a cloth. Few bottles survived the attempts to remove the bottoms. Next came the veil respirator, which was a long piece of porous cloth folded on itself to make a pocket, and this was expected to contain sodium carbonate, sodium hyposulphite, glycerin and water. The pad was made to cling tightly to nose and mouth. By an unpardonable error sodium hydrate was used instead of carbonate, with sad results to assemblers and respirers. Lord Kitchener, instead of approaching the physiologists of Britain, appealed to the women to manufacture respirators, and a million were made in one day. These were gauze pads moistened with sodium hyposulphite solution. Alas, the cotton wool of which they were made, when wet, blocked not only gas, but air to breathe. All this effort was therefore useless; the respirators were destroyed and their manufacture was stopped.

Next came the "P.H." helmet, which was a damp, sticky and malodourous bag of flannelette thrown over the head and tucked underneath the collar of the tunic. The absorbing chemicals were hyposulphite, sodium phenate and hexamine; these last two were added to catch phosgene then being employed. The box respirator, which was to serve as model for a considerable period, was not evolved until 1916. Now a dispassionate criticism cannot acquit the military medical services of gross blundering in these early attempts. Had the authorities got in touch with almost any physiological laboratory, the box respirator would have been evolved in 1915, soon after the first use of chlorine. When the distinguished physiologists J. S. Haldane and E. H. Starling were eventually consulted, one was looked on askance as the brother of Lord Haldane and the other was regarded as an impossible crank. Physiologists throughout the world had experimented with mouthpieces and various respiratory devices in metabolism experiments and mine rescue work and had brought these to a fair degree of perfection. In my own laboratory I had used for years the device invented by Zuntz, in which there were an outlet valve, an inlet valve, a saliva trap, a rubber tube of sufficient internal diameter to allow breathing without resistance, a rubber mouthpiece with flanges between lips and front teeth, and pads to be bitten by the back teeth, and a nose-clip familiar to workers on human metabolism. This Zuntz apparatus was heavy and access to the valves was not easy; so my then technical assistant, Mr. W. J. McCaw, studied this apparatus and devised another on the same model, but lighter, made from common tubing and with valves readily exposed and cleaned. This respirator had been already put to considerable use by me when news of the chlorine attacks arrived in April, 1915. As all accounts of protective respirators disclosed a lamentable ignorance of what was common knowledge amongst physiologists, a committee was formed in Melbourne consisting of Professor Laby, Professor (later Sir David) Masson and myself to devise an effective respirator. The Zuntz respirator simplified by W. J. McCaw was adopted at once. Professor Laby enlarged and improved the valves and, by proper specification of materials, their quality and dimensions, made it possible for mass production to be easily undertaken. As absorbent we chose soda-lime in a carton, in a form familiar to physiological investigators. The formula for making the soda-lime I obtained from the writings of Professor Benedict, of the Carnegie Nutrition Laboratory in Boston, and I handed this over to Professor Masson. Masson's contribution was to organize tests of the respirator in a trench dug in the University grounds. The rubber tube adopted was smaller in bore than that employed by me in my metabolism experiments, where breathing for an hour or more had to be carried out without discomfort. I was at first apprehensive of this, but subjected the tube to a series of tests in which a human being and an artificial respiration apparatus breathed through the tube, and I compared the pressures close to the mouth by means of a water manometer. As there was no apparent difference, and I could easily detect one millimetre of water, I gave way and so the narrower tube was adopted. Goggles and nose-clip completed the outfit.

Here in Australia we were far from the theatre of war, and were not advised of the change of gas employed by the Germans. Our respirator was devised to withstand chlorine; had we been informed of the use of phosgene and other gases we could have made the requisite changes in size and contents. The history of this respirator is being written by Dr. Butler, and we may leave the whole matter to his balanced judgement and critical acumen; but I think we can claim that at the time it was made it was the best pattern extant. Professor J. S. Haldane warmly commended it, though he was a little sceptical about the diameter of the rubber tube. I may say here that many physiologists dealing with respiratory apparatus are inclined to be too cautious in recommending tubes of wide bore, forgetting the small sectional area of the normal glottis.

The box respirator eventually adopted bore a striking resemblance in form to ours, but of course was capable, thanks to charcoal and fibre pads, of absorbing a wide range of gases and smokes. When mustard gas appeared, the whole head had to be covered to prevent burns, and the irritating nose-clip was no longer necessary.

Conclusion.

Should poison gases and smokes be employed in future wars, it may well be that attempts to filter out the toxic agents will be given up, and oxygen apparatus similar to that used in mountaineering or mine rescue be resorted to. A few years ago it was possible to carry only two hours' oxygen supply on one's back; but now, I believe, something like five hours' oxygen supply is possible. With proper clothing any form of poison gas could be countered by this means.

I have assumed that protection against poison gases and smokes is necessary. Military authorities are sceptical about its use by an enemy in any invasion of Australia; but the principle holds that if a populace about to be attacked is unprepared for any weapon of war, that weapon will be chosen by the invader.

Amongst books that can be recommended the following may be mentioned: "History of the Great War: Medical Services. Diseases of the War", Volume II, 1923; "Chemical Warfare", by Fries and West, 1921; "Gas Alert!", by Alan Brooksbank, 1938; "Chemicals in War", by Prentiss and Fisher, 1937; "The Medical Department of the United States Army in the World War", Volume XIV, 1926; "Noxious Gases", by Yandell Henderson and H. W. Haggard, American Chemical Society Monograph Series, 1927; "*Schädliche Gase*", by Flury and Zernik, 1931; "Medical Organization and Surgical Practice in Air Raids", by P. H. Mitchener, 1939; "War Gases", by M. Sartori (translated), 1939.

W. A. OSBORNE,
Professor Emeritus.

Melbourne.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at the Medical Society Hall, East Melbourne, on September 6, 1939, DR. A. E. COATES, Vice-President, in the chair.

Germs and Generals.

DR. F. KINGSLEY NORRIS read a paper entitled: "Germs and Generals" (see page 781).

SIR JAMES BARRETT thanked Dr. Norris for his most interesting address. He said that as one who knew the country and had had to deal with the problems in the Jordan valley and elsewhere during the Great War he would like to add a third objective to the two aims of army medical officers which had been defined by Dr. Norris. In addition to the prevention of disease and the cure of disease and injuries, it should be an aim to provide work for the disabled.

Sir James Barrett said that when in 1914 he was principal medical officer at Gibraltar, he had met eight young medical officers who had arrived for duty. When after three weeks they had interviewed him to complain that the hospital was empty, although they had come to do war surgery, he had pointed out to them that every patient that got into the hospital should be regarded as a failure of their work. During the Great War medical officers in various areas of military operations had had to encounter typhus, typhoid fever, cholera, malaria, dysentery, plague, relapsing fever and other scourges. Malaria and dysentery had not been controlled; Chauvel at Jaffa had 30,000 men and Chaytor had 15,000, so Megiddo began with 35,000 troops. There were only 5,400 left afterwards, and only 1,000 were wounded by bullets; the remaining casualties were due to malaria. Canalizing was very important in making a sector safe from malaria. Four million people in the world died annually from malaria.

Sir James Barrett went on to speak of the ease with which a person got dysentery; carelessness through not changing the clothing on one night was known to be penalized by an attack of dysentery. He emphasized the fact that the task of the medical officer was much more than the treating of disease. He said that he would like to see an offer made through the Federal Council that the services of the members of the British Medical Association in Australia were unconditionally available to the Government in the present state of emergency.

Sir James Barrett then referred specifically to the problem of venereal diseases in the army. It had been said that the number of casualties from that cause alone in the British Expeditionary Force in France was large enough to account for the defeat of Gough's Fifth Army in March, 1918. They should not neglect any means, moral, social or medical, to reduce the incidence of venereal disease among troops in camp on active service. On the moral side the church influences could be marshalled; the Young Men's Christian Association, canteens and clubs of various kinds could exert social pressure, and the medical profession had a powerful influence by means of its spreading of the truth and giving the facts in lectures and pamphlets. They must also, however, be prepared to recommend prophylaxis and to carry out early and efficient treatment. Through lack of consciousness of the military objective, slackness by medical officers could lose an army. A medical service could render defeat certain or victory possible.

DR. ERIC COOPER said that he could only hope to add a few points of minor interest after what had already been said. Dr. Norris's survey had been amazing, and had put them all greatly in his debt. Dr. Cooper thought attention should be drawn to the desirability of freeing the fighting men from all defects before sending them into the firing line; it was not enough merely to attempt to prevent disease. The medical officers had to upset the tradition that it was necessary for soldiers to be dirty when fighting or in camp. Attention to general hygiene in addition to measures to control insect and other disease vectors was essential. Attention to the dietary of the troops was also an important responsibility of the medical officers. In 1918 the energy values of the dietary of the opposing armies were: British, 4,000 Calories; French, 3,200 Calories; and the Germans, only 1,700 Calories.

Dr. Cooper said that he would like to take the opportunity of referring to some of the measures to be adopted in the event of mobilization or preparation for an overseas force. "T.A.B." injections were to be given in smaller dosage; three injections would be used, amounting in all to 1·25 cubic centimetres of the Commonwealth Serum Laboratories' vaccine. Though vaccination against smallpox was frowned on in certain quarters in Australia, the army medical officers would insist on it for the troops; the method of intradermal inoculation had superseded the scarification method. It had been learned that the British troops leaving Great Britain and the French troops would all be immunized with "T.A.B." vaccine and also with tetanus toxoid. One final point mentioned by Dr. Cooper was that sulphanilamide reduced the efficiency of air pilots quite appreciably; it should be forbidden for those about to fly.

DR. THOMAS CHERRY said that the hotter the climate, the more strict must be the sanitary measures of every description. In the Jordan valley they had encountered temperatures over 104° F. for between 100 and 150 days. Such a climate imposed an abnormal strain, and any trifling infection might develop seriously. He was glad to hear of the insistence on inoculation against smallpox; they had only had a few cases in Egypt, but the natives around them had had all sorts of skin diseases. The "T.A.B." injections were very valuable, as the troops were continually meeting human excreta of all ages, and the flies found them too. The water carriage of typhoid fever was placed in a position of safety. Malaria was a mystery in the Jordan valley; at a wadi near Jericho there was a beautiful stream and no one lived there permanently, yet those camping there were almost certain to get malaria; either infected mosquitoes could fly a distance of three miles or they remained infected for a very long while. Dr. Cherry said that he had been interested in the slides Dr. Norris had shown, and his account of the fate of Sennacherib's army; he thought, however, that the disaster was due to pneumonic plague and not to malaria. Herodotus had said that at Pelusium there was a statue of a king with a mouse in the hand; Sennacherib had intended to invade Pelusium, and in the temple told of the swarm of mice and the plague that broke out and destroyed the invading army. Herodotus

explained that the mice ate the leather of the bows of the Assyrians, who were not able to defend themselves, as they were so ill. A more modern explanation would be that the mice were disease vectors. In recent times the Chinese armies in the neighbourhood of Mukden were decimated by pneumonic plague, which was fatal and was spread by coughing.

DR. W. W. S. JOHNSTON said that he would speak of the epidemics which had occurred amongst the Australian troops in the war of 1914 to 1918, as similar epidemics might occur again. Cerebro-spinal meningitis was responsible for many admissions to the Melbourne Hospital from the military camps at Broadmeadows and Seymour. The treatment was arduous and not very successful, as the mortality rate in the epidemic was 42%. Dr. N. Hamilton Fairley and the late Dr. C. Alwyn Stewart had conducted research work of great value, and the late Dr. R. O. Douglas had introduced improvements in treatment. Measles was of military importance. After the South African war a transport had considerable sickness on board, in spite of the Board of Trade regulations; seventeen deaths occurred from measles and from bronchopneumonia following measles. On the transport *Orsova* in 1915, between Melbourne and Egypt, there was a great outbreak of measles. Mumps also caused great morbidity; 3,000 cases occurred in a division in three months. Mumps was thought to have been brought from Australia by that division, and it spread throughout the troops in France. A great epidemic of influenza broke out in the winter of 1917, and was followed by a second wave, which also caused very heavy losses.

Dr. Johnston pointed out that the army medical officers would get a great deal of practical assistance from members of the practising profession. They wanted to know the effect of sulphanilamide treatment in cerebro-spinal meningitis, and how they stood with regard to serum therapy in measles. The possibilities of immunization against influenza were also definitely improved. In conclusion Dr. Johnston commented on the spreading of disease by means of bombs. He thought that the germs would be rendered sterile by the high temperatures of projectiles; but diseases could be spread by infecting plants and animals.

DR. JOHN DALE expressed his great interest in the subject under discussion. He had an extract from a publication of the Council for Scientific and Industrial Research of a medical record of the Italian army in Abyssinia. The Italians had been extraordinarily successful and had taken great trouble over both sanitation and diet; the dietary had included fresh fruit, but the meat allowance was very small according to English standards. Dr. Dale said that it was part of the duty of medical officers to insist on the importance of the dietary. Epidemic, dysenteric and enteric diseases did not damage people who were well fed. Dysentery in France was very prevalent, but the strain was a mild one. Dr. Dale then spoke of morbidity from skin infections and of the amount of unfitness from scabies and the results of "lousiness", which he described as terrific. He emphasized that the first signs of the presence of lice in a military camp were well worth looking for with the utmost care; they had not been able to do more than palliate the "lousiness" on active service during the past war. Cerebro-spinal meningitis was a disease of young people who were overcrowded in the spring-time. Dr. Dale said that the medical officers must not allow the soldiers to be overcrowded, or it might quite easily appear; they should be spaced out in well-ventilated barracks. He mentioned that measles was at that time affecting the civil population in the metropolis, and great care would be necessary to keep it out of the encampments and to avoid the spread to men recruited from the country districts.

DR. KEITH HALLAM thanked Dr. Norris for stirring up interest in epidemics. He said that Dr. Norris's address was painted with the brush of an intellectual; it was a gem with many facets lighting up obscure places in history. Dr. Norris had cast a gleam on the Athenian plagues. Dr. Hallam would like to draw attention to a racy account of one of them, as described by Lucretius in "*De Rerum Natura*", towards the conclusion of that great work. Dr. Norris's address should stimulate them to delve into the history of the past and keep the light of intellectuality aflame.

DR. KENNETH SMITH referred to the necessity for medical officers to lecture on sanitation and on dangers to health, such as venereal disease and epidemic illnesses. There was every reason to draw up a series of lectures in outline, as most medical men were bad lecturers; they should keep at the troops and at the combatant officers to take the necessary steps to maintain health and to prevent disease.

DR. J. K. ADEY spoke of the difficulties in controlling dysentery. He said that by the use of injections of polyvalent Shiga-Flexner vaccine early in the illness dysentery had almost been done away with in the mental hospitals. He would like to know that some action was to be taken about inoculations against cholera; he understood that there were large stocks of the vaccine available in Australia.

DR. C. W. ADEY spoke of the use of serum in the prevention of measles. He said that pooled human serum might be used as a prophylactic during the first five days of the incubation period. It could be expected to mitigate the attack if used during the succeeding five days of the incubation period; but it was of no proved value in treatment. Accordingly it was of no use unless measles was near by, and immunity could be conferred only for two or three weeks, after which the recipient became susceptible again. If a case occurred where troops were congregated together, the contacts could be protected or the consequences of infection mitigated. The human serum was difficult to obtain; it was expensive and so far had been used only for children.

Dr. Adey then expressed the opinion that anthrax germs could be used in bacteriological warfare. The technical difficulties of infecting the enemy would be great, and it would even be difficult to prevent the spread of the disease to one's own troops. It was probable also that foot and mouth disease could be used as a weapon; they could not be quite sure that bacterial warfare was impossible.

DR. H. BOYD GRAHAM said, as an old campaigner, that he had noted a regrettable amount of lack of knowledge and of apathy among military medical officers concerning the inspection of food intended for consumption by troops. Under conditions of civil practice that type of work was undertaken only by a few specialists, and most of it was left to specially trained lay inspectors. He wished to draw the attention of the competent military authorities to the desirability of instituting a special course of training in military dietetics and food sanitation for medical officers undertaking active duties.

Dr. Graham also laid emphasis on the importance of imparting to medical officers information intended to show them the considerable powers, apart from those of military rank, that the medical personnel could and should exert in the army for the welfare of all concerned. In many important respects the medical officers could protect the rank and file from many unnecessary hardships which it was proposed to impose on them as a matter of military exigency. The non-medical staff of the army could not be expected to give due consideration to those important aspects of military service, especially when working at high pressure under active service conditions, unless they had definite and detailed advice couched in sufficiently strong terms and backed by the use of all the powers vested in medical officers necessary for the implementation of the advice tendered.

DR. A. E. COATES, from the chair, gave a résumé of the discussion and formally seconded the motion moved by Sir James Barrett concerning an offer of the services of the members of the British Medical Association in Australia to the Federal Government. The motion was carried without dissent.

Medical Societies.

THE MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held at the Children's Hospital, Carlton, Melbourne, on September 13, 1939, DR. D. O. BROWN, the President, in the chair. Part of the report of this meeting appeared in the issue of November 18, 1939.

Sulphanilamide Treatment at the Children's Hospital.

DR. FREDA PLARRE showed a girl who had recently recovered from influenzal meningitis after sulphanilamide treatment and who had only minor residual disability. Dr. Plarre said that in the past six months two other children had recovered in similar fashion after sulphanilamide treatment from that condition, which had formerly almost invariably proved fatal.

Dr. Plarre then spoke of the estimation of the sulphanilamide content of body fluids. She said that sulphanilamide administered orally could be recovered by laboratory methods from the blood, cerebro-spinal fluid, urine, saliva and bile. In blood, cerebro-spinal fluid or urine it might be present as free or active sulphanilamide on the one hand, or as combined or inactive acetyl sulphanilamide on the other. It might be all present in the free form; but as a rule the free form was in lower concentration than the total sulphanilamide made up of the free and combined forms. There was no established relation between the concentration of the free and of the combined forms in any of the body fluids either at any one time or at different times. From the clinical point of view she regarded only the concentration of free sulphanilamide as of importance. From the results obtained at the Children's Hospital the optimal concentration of free sulphanilamide in the blood was considered to be a concentration of between four and six milligrammes. In that condition of the blood satisfactory clinical results had been obtained in pneumonia and in gonorrhœa, and the same concentration in the cerebro-spinal fluid was favourable in influenzal and meningococcal meningitis. That concentration was in most cases obtainable without vomiting within twenty-four hours if a dosage of one gramme of sulphanilamide per twenty pounds of body weight per day was used.

Dr. Plarre then stated that about half the total amount taken orally was excreted in the urine within twenty-four hours; but the proportion between the free and combined sulphanilamide in the blood and in the urine did not bear any direct relationship. She also said that the concentration in the cerebro-spinal fluid might almost equal that in the blood; but in meningitis there was usually only a little over three parts to four in the blood, free and combined forms both being present. Dr. Plarre added that the concentration in the saliva and in the bile was considerably less than that in the blood.

Dr. Plarre then proceeded to report the results of an analysis she had made of 348 cases of lobar pneumonia treated at the hospital between March 1, 1938, and June 30, 1939. She had rejected 32 cases because of the presence of other gross lesions, such as congenital anomaly of the heart, congenital syphilis and mongolism. Of the remaining 316 cases she had formed two series: series A consisted of 84 patients treated with "M & B 693", and series B consisted of 232 patients not treated with "M & B 693". An analysis of the seasonal incidence revealed the following distribution of treatment: in summer, series A, 12, series B, 55; in autumn, series A. 55, series B, 56; in winter, series A, 17, series B, 63; in spring, series A, 0, series B, 58. Eleven deaths occurred in all—two in series A (2·4%) and nine in series B (3·9%). Of the two children who died in series A, one was eighteen months of age and was extremely undernourished, and the other was aged two and a half years and died within two days of admission to hospital; all the lobes of the lungs except the right apical lobe were found at the autopsy examination to be consolidated. Both the deaths occurred in autumn. Among the nine deaths in series B, the patients were under two years of age in six instances and all of them had had empyemata; three of the children were over two years of age, death being ascribed to cardiac failure in one instance and to the severity of the pneumonia in the others; the seasonal distribution of the deaths was: winter, two; spring, four; summer, nil; and autumn, three.

Dr. Plarre said that she had analysed the cases separately from the aspect of the duration of elevation in temperature when the lobar pneumonia was uncomplicated. She said that she had included the number of days of fever before the patient's admission to hospital and added that number to the days of fever after admission to the hospital. Of 214 cases she had placed 59 in series A, and had found that the average number of days of fever was 5·2. For the remaining 155 in series B the corresponding figure was 6·6 days. The average time after the onset at which the administration of "M & B 693" had been commenced was four days, so that the temperature had fallen and remained down within twelve days in series A; the temperature had fallen within two days in 48 out of the 59 instances. In the early part of the period under review the treatment had not been initiated promptly after admission to hospital as a rule, and frequently inadequate amounts were given. From the figures it appeared that the use of "M & B 693" shortened the duration of the pneumonia by approximately one and a half days. Dr. Plarre had also analysed the incidence of complications and had found that it amounted to 7% in series A and to 15% in series B.

DR. ROBERT SOUTHBY, after congratulating Dr. Plarre on her initiative and on the manner in which she had presented the analysis of the hospital series, commented on the much smaller proportion of complications when "M & B 693" had been used as the most striking aspect of the report. He said that his purpose in speaking was to ask Dr. Plarre for information about the mode of administration to babies and whether any maniacal effects beyond the delirium at times associated with lobar pneumonia had been noted in the histories of the patients treated with "M & B 693".

DR. H. DOUGLAS STEPHENS asked for information about the occurrence of subacute or acute hæmorrhagic nephritis in the treated cases. He remarked that he had experienced the occurrence of a lobar consolidation on the opposite side while a patient was receiving sulphanilamide treatment.

DR. J. B. COLQUHOUN said that he was glad to have facts brought forward about the results of treatment with a drug which was being used for a wide range of conditions. He knew of a case of meningitis in which "M & B 693" was used in the early stages, but the outcome was entirely unsatisfactory because the patient had tuberculous meningitis. He understood, too, that dietary restrictions were recommended and that clinicians were warned to beware of nephritis.

DR. H. L. MCLORINAN, after congratulating Dr. Plarre on her investigation, spoke of the experience during the past six months at the Queen's Memorial Infectious Diseases Hospital at Fairfield, where they had been investigating the value of "M & B 693" in the treatment of patients with measles, frequently complicated by bronchopneumonia. To the end of the month of August, 1939, 375 patients had been admitted to the hospital during the epidemic of measles, and in 209 instances the measles was complicated by bronchopneumonia; 175 of the patients had been treated with "M & B 693". Dr. McLorinan explained that they had started hopefully to retain a control series not treated with the sulphanilamide, but at an early date they had become convinced on clinical grounds that they would do wrong to withhold the treatment to preserve the control series. Of the 209 patients with pneumonia, 175 had "M & B 693" with only five deaths—four from endocarditis and one from a massive streptococcal empyema. The results were undoubtdely good; but it was necessary to be somewhat guarded in ascribing them to the sulphanilamide treatment, because, speaking generally, the epidemic appeared to be milder in type than previous epidemics. Dr. McLorinan remarked that "M & B 693" would be well tested during the war. He had been interested in the question of vomiting occurring with "M & B 693" treatment. They had found

it to occur only rarely in children, and with children they had not experienced any difficulty; but with adults vomiting occurred commonly; even three or four doses seemed to produce gastric irritation. They had tried smaller doses given more frequently and the use of effervescent glucose preparations, and thought that those measures had helped to overcome the difficulty. There was no question that the children, and particularly babies, had tolerated the sulphanilamide very well.

With reference to cyanosis, Dr. McLorinan said that in no case had it mattered; a few of the patients had become cyanotic rapidly and unexpectedly. A patient might be taking the drug quite satisfactorily for a couple of days and within half an hour might become cyanosed; the cyanosis disappeared when the treatment was discontinued and might not reappear when it was given again. He stated that examination of the blood cells had not been carried out to any extent. No instance of agranulocytosis had occurred in the hospital; but one patient, who had received sulphanilamide other than "M & B 693" prior to admission to hospital, had been admitted with it. Dr. McLorinan added that there was no doubt that the sulphanilamides had some effect on the white cells; but "M & B 693" had not had any serious effects on any of the patients in the short period over which it had been used for the average patient. He concluded by saying that he was glad to have heard Dr. Plarre's report on the results at the Children's Hospital.

Dr. Brown, from the chair, thanked Dr. Plarre on behalf of the Society and invited her to reply to the matters raised in the discussion.

Dr. Plarre, in reply to Dr. Southby, said, with reference to the administration of "M & B 693" to babies suffering from pneumonia, that a number of them had vomited after the first few doses, but that after the treatment had been suspended for half a day or so it had been resumed and was tolerated well. In reply to Dr. Southby's second question, Dr. Plarre said that no instances of mania or even severe cerebral disturbances were recorded in the case histories she had analysed; many of the older children had complaind of headache, and some of the babies had appeared to have it, as judged by notes that they held the hands to the head or by other similar evidence. Dr. Plarre then informed Dr. Stephens that she remembered two examples of hæmaturia which had cleared up rapidly on withdrawal of the treatment; but she had not gone thoroughly into the details about the complications and had not looked specially for the incidence of nephritis. Some of the patients might have had focal infections of the urinary tract which would produce urinary symptoms unrelated to the treatment. Finally, Dr. Plarre informed Dr. Colquhoun that dietary restrictions were not a drawback to treatment. At first, eggs and onions and other sulphur-containing foods had been withheld, but meat had been given freely. As meat contained sulphur and as no harm had resulted from its use, the embargo on sulphur-containing foods had been lifted; but the contemporaneous use of sulphates and sulphanilamide was strictly avoided.

Dermatological Conditions.

DR. JOHN H. KELLY showed a boy, aged twelve years, who had a basal-celled epithelioma on the left cheek. Dr. Kelly demonstrated from the lesions on other children the differentiation from *lupus vulgaris*, *granuloma annulare* and certain other conditions. He said that the child had been shown, among others, at the conjoint meeting of the Society with the British Medical Association on August 9, 1939.

Correspondence.

ANÆSTHESIA FOR THE ISOLATED PRACTITIONER.

SIR: In your issue of August 19, 1933, I described a useful method of anæsthesia with prenarcosis by morphine and paraldehyde. Subsequent experience showed that this was unsatisfactory in cases of acute abdomen and many other emergencies. Consequently, I tried Gwathmey's technique of colonic ether anæsthesia, which was described in *The Journal of the American Medical Association* of August 10, 1929, page 447, and found it most gratifying. However, it was soon realized that this ritual was unnecessarily elaborate and could be greatly simplified without loss of efficacy or safety. This is done by giving a short general anæsthetic or an injection of "Evipan", whilst the ether-oil mixture is being put into the rectum, to stop struggling and the expulsion of the mixture.

This method, which I will describe, gives complete relaxation and an anæsthesia lasting up to three hours. The time can easily be lengthened by pouring more of the mixture into the rectal tube, which is left inserted during the operation. It has been used for every type of abdominal operation and the patients usually awaken some hours later without any pain, vomiting or memory of having been operated upon. Repeatedly they have asked when the operation was to begin.

To avoid mistakes and misunderstandings I always give my orders for the prenarcotics in writing.

Here they are: (We will suppose the operation is to be at 10 a.m.)

Step 1.—The night before, patient gets "Luminal", 1-2 grains, or veronal, 10 grains.

Step 2.—7.30 a.m., bowel wash-out with tap water.

Step 3.—8 a.m., hypodermic injection of one "Tabloid" hyoscine Co. "B" (that is, morphine sulphate, ¼ grain, atropine sulphate, $^1/_{100}$ grain, hyoscine hydrobromide, $^1/_{100}$ grain).

Step 4.—9.30 a.m., another hypodermic injection of "Tabloid" hyoscine Co. "B" (that is, Step 3 is repeated).

Step 5.—9.45 a.m., anæsthetize the patient with any anæsthetic you usually prefer. Personally I use chloroform. Very little of any of them will be required before the patient will allow the introduction of the rectal tube through which the ether-oil mixture is to be poured into the rectum (not the descending colon).

Step 6.—Attach a funnel and tube to the rectal tube. A connexion having a tap is useful.

Step 7.—Allow to run slowly into the rectum the ether-oil mixture. The ether-oil mixture is a mixture freshly prepared of ether and warmed olive oil in the proportions of two parts ether to one part olive oil. Paraldehyde is not used as in the Gwathmey method. The amount of this mixture used depends on the size of the patient. It varies between one containing three ounces of ether for a child to one containing six ounces of ether for a big man. If one is worried at the depth of the anæsthesia, it is a simple matter to turn on the tap in the rectal tube (which is not removed until after the operation) and let some of the mixture run out. However, the patient is rarely deep enough to lose his eye reflexes and one soon gets to disregard the quiet breathing and to concentrate solely on the operation itself.

Step 8.—Infiltrate the site of the incision with 1% "Novocain" ("Æthocaine" is "Novocain" and is ten times cheaper) or with $^1/_{1250}$ "Percaine". This should be made up in Ringer's solution, which is easily prepared with "Soloid" Saline Co. However, it is wise to add one or two cubic centimetres of dilute hydrochloric acid to each 500 cubic centimetres of the saline solution, so that it will turn Congo red blue. This clears the solution when the "Percaine" tablet is dissolved and it makes "Novocain" act better. This infiltration should be wide and deep, especially in the direction of the nerves supplying the part of the abdominal wall being opened. Four to six ounces of these solutions can be safely used. I have used more. Enough adrenaline should be added to the local anæsthetic solution to make a 1 in 250,000 solution. Much adrenaline causes sloughing of the wound. The infiltration can be continued (if there is any suggestion of rigidity) when the muscle layers are reached and also when the peritoneum is seen.

Step 9.—If ballooning of the bowels into the wound is feared and if no pus is present in the abdomen, four ounces of 1 in 1,500 warmed "Percaine" saline solution can be put into the abdominal cavity with a syringe or through a nick in the peritoneum. One should then wait a few minutes for the absorption anæsthetic effect. The solution put into the abdominal cavity escapes as soon as the cavity is opened. If pus may be present, put another ounce and a half of ether (mixed with olive oil) into the rectum. Step 9 is rarely necessary.

Step 10.—After the operation is over, open the tap on the rectal tube. After two or three hours of anæsthesia there usually escapes several ounces of the ether-oil mixture. Washing out the bowel with tap water is optional, but it gives the opportunity to leave behind a pint or so of tap water. As a warrant of the safety of this method of anæsthesia may I say that I removed my only child's appendix whilst she was so anæsthetized by me.

I trust that this may be a help to those who cannot obtain a competent anæsthetist; but, as a matter of fact, this form of anæsthesia obviates the necessity of an anæsthetist anywhere, it requires no skill and the materials and apparatus can be had in the most poorly equipped hospital.

Yours, etc.,

EDWARD J. HANLY,
Government Medical Officer.

Port Arthur,
Tasmania,
October 26, 1939.

RHEUMATISM IN CHILDREN.

SIR: To one depressed by the hopelessly inadequate facilities available for the treatment of rheumatism, it has been refreshing indeed to read the leading article in your journal of October 28.

The hurried cycle—so familiar to pædiatricians—of in-patient, convalescent hospital, home to bed, and then back to out-patients, hardly fulfils the criteria of unity of observation and maintenance of control so essential in the management of rheumatic infection.

The period "home to bed" is particularly unfortunate, for discipline is often impossible, the diet frequently poor and the environment only that in which the child originally developed his disease.

The ideal seems to be a hospital modelled on the lines of Highwood Hospital for Children, Brentwood, Essex. This hospital, situated in the country within easy reach of London, is under the control of the London County Council, and is devoted entirely to the care of rheumatism (including chorea) and pulmonary tuberculosis in children—two diseases in which the treatment has much in common. Patients are drawn from all the London voluntary and council hospitals, and are admitted from the general hospitals as soon as arrangements can be made for a bed; usually within the first fortnight. This period of delay is useful in allowing initial treatment for the acute symptoms, and the pain has usually subsided before transfer takes place.

Children are warded roughly in age groups, and a school teacher is in attendance in each ward. The child progresses through the stages of increasing number of pillows, and later, increasing number of hours out of bed. In the majority of cases "promotion" can be made each fortnight. When the child is capable of being up eight hours daily he is discharged. The period in hospital is seldom less than four months, and averages six to seven months. Individual cases may require a considerably longer period.

The working expenses of such a hospital are low, for few special facilities are necessary, and administrative requirements are small. As nursing duties are light, a low ratio of nurses to patients can be maintained. It is essential that all patients can always be in view of the nurse in charge, in order that discipline and rest be observed.

It would be interesting to compare the estimated working expenses of such a hospital to meet our requirements, with the annual pensions bill payable to rheumatic fever cripples.

I do not know whether detailed statistics are available, but after working on the staff of this hospital for some months I felt that the children were being given every opportunity to recover, and that the results were indeed gratifying. The problem of relapse after discharge still occurs in some cases, and, no doubt, will continue to occur until we know more of the nature of the infection and of the immunological reactions of the disease.

Yours, etc.,

W. McL. SMITHERS.

63, Collins Street,
Melbourne,
November 4, 1939.

PROTECTION OF PRACTITIONERS' INCOMES.

SIR: Considering the great difficulty of administering such schemes as proposed by the Royal Australasian Colleges of Surgeons and Physicians and general practitioner groups, why not a compulsory receipt stamp tax on all medical receipts for the duration of the war?

Continued and thorough education of the public on the obligation of receiving a receipt for all medical fees and that such receipt must bear the appropriate percentage income protection stamp would provide an almost self-administering fund. All lodge contract, insurance and other sources of medical income could be included along with private fees.

A 5% stamp tax (one shilling in the pound) should provide a fund more than adequate to protect men on service from drastic reductions in income. Reimbursements from this fund would be based on income tax returns (personal exertion only), with a fixed minimum income for married men.

Yours, etc.,

FRANCIS F. D'ARCY.
H. G. FURNELL.

33, Collins Street,
Melbourne, C.1,
October 27, 1939.

M.D. DEGREES IN AUSTRALIA.

SIR: In his letter of August 27, 1939, "Warum" has raised a very important subject—the discrepancy of M.D. standards in the various Australian universities. In some it is the practice of young graduates to take the examination at the minimum time requirement (two years) after graduation. Whilst the minds fresh from their final examinations are crammed with fact and theory, they must inevitably lack the broad background of experience which time alone can give.

The title M.D. should indicate one who has passed through the novitiate stages of early medical graduation and has a mind ripened and mellowed through years of practice and experience. It is questionable whether this stage can be obtained until ten years after graduation. This should be the first requirement. As the highest ideal of the profession is to advance the cause of medicine by extending our knowledge of disease, the second requirement should be to produce evidence of constructive efforts either in practice with spare time devoted to some worthwhile research or as a teacher and researcher combined. An M.D. conferred on the above lines would have a very real value. It would be an award for merit, it would be a stimulus for practitioners to prosecute research. To ask a senior graduate not engaged in teaching to spend a year in the hard task of relearning academic fact and theory is not merely to insist that he gives up research for this

period, but it also means that he must face a competitive examination which he realizes is not a true test of knowledge.

To many men of the research calibre the thought of an examination is a nightmare from which the only escape is the decision not to attempt it. In years past there may have been adequate reason for the examination system as a part of the M.D. The creation of the Royal Australasian Colleges of Surgeons and Physicians has altered this. Recent graduates have the chance of obtaining recognition of special aptitudes through this avenue.

They should be encouraged to work for the M.D. recognition by actively prosecuting research after they have obtained their membership of the Royal College. Such a plan would prevent the anomaly of finding men of the highest mental capacity and professional attainments, who have devoted their lives to their practices and to constructive researches yet do not possess the M.D. degrees. The lack is purely because they have been too fully occupied in their work to take off the time necessary to brush up academic medicine or that they have an examination failure phobia.

The same paradox applies to the Master of Surgery degree. One sees inexperienced young graduates taking the examination, and because they know all the answers from the book are dubbed Masters of Surgery, while the surgeon with years of sound operative experience and practical knowledge of surgery is often failed because he lacks detailed knowledge of pathology, a subject which, in actual practice, he knows he must defer to the trained pathologist.

Yours, etc.,

"JUSTICE."

November 8, 1939.

THE FUTURE OF MEDICAL PRACTICE.

SIR: Dr. Brown's letter on this subject opens up a large subject: the future of the profession is but part of the future of the nation; as Dr. Brown himself says: "No side of the community life is exempt." He points out that hospitals are financed and supervised by a central body, and appears to regard nationalization of medicine as inevitable; he fears its effect on the spirit of the profession, but does not see the loss of freedom entailed by a State service.

Experience shows that the majority of doctors in the State and Commonwealth service do admirable work, and without the specific financial fears and aims such as spur on general practitioners, sometimes to good and sometimes to evil; but, and it is a big but, they suffer from a lack of freedom, both personal and professional, and a standardization of ideals and expression, and of red tape, from which we are free. It is the loss of freedom and individual initiative, and responsibility to someone other than the patient and his friends, with all their consequences, and not the loss of vocation, that deters the profession from welcoming either national insurance or a State service.

"Planning", as mentioned by Dr. Brown, so prevalent throughout the world, is as infectious an idea as is the influenza germ, and in a world built on a debt-commodity money such as we use, about as disabling, as may be seen from the condition of the world today, where totalitarianism produces war and yet more totalitarianism. Indeed, "finance", our existing theory of money and its use, is at the root of our inefficiencies and of our cramping "planning"—its responsibility for unemployment, indebtedness of primary industry, malnutrition, faults in education, in hospitals *et cetera* and for war is demonstrable. Finance is in control of all sides of national life; it must be criticized and corrected if we really wish to make the world, including the practice of medicine, fit for democracy. We must seek a more excellent way, a way to retain individual freedom of action, thought and expression, and of free organization where necessary.

A necessary preliminary to securing freedom with security and efficiency, not only in medicine but for the whole community, is an inquiry by royal commission into the theory of money, the theory of finance, "into suggestions for the reconstruction of the whole economic structure" (see paragraph 487 of the report, issued in 1937, of the royal commission to inquire into the monetary and banking systems at present in operation in Australia).

To accept regimentation instead of inquiry by the Government of Australia is to forgo our constitutional right of freedom guaranteed by section 92 of our Constitution, and saved for us when the Australian people rejected the marketing referendum with its regimentation of the people, and recognized by our Parliament when it openly accepted conscientious objections as a right of all Australians even in war-time.

Yours, etc.,

MARY C. DE GARIS.

Geelong,
Victoria,
November 5, 1939.

A LETTER OF APPRECIATION.

SIR: I am directed by the Council to ask if you would kindly publish the enclosed letter in THE MEDICAL JOURNAL OF AUSTRALIA.

Yours, etc.,

J. G. HUNTER,
Medical Secretary, New South Wales Branch, British Medical Association.

British Medical Association House,
135, Macquarie Street,
Sydney.
October 26, 1939.

THE N.S.W. BAPTIST MINISTERS' FRATERNAL.

14th October, 1939.

The Secretary,
British Medical Association,
N.S.W. Branch,
B.M.A. House,
135/137 Macquarie Street,
Sydney.

Dear Sir,

At a meeting of the Baptist Ministers' Fraternal of N.S.W., I was directed to forward this letter to you, and to ask you to make its contents public through your official journal.

The members of the Fraternal desire to convey to the members of the medical profession their very high appreciation of all the generous services so graciously rendered by the medical fraternity. Perhaps every clergyman in the State has experienced the care and skilled attention of doctors and surgeons and has found that this is all given gratuitously. There are also many occasions when private attention has been given to members of our congregations who were quite unable to provide the ordinary attendance fees.

We would like you to know that we are deeply grateful for all that has been done in these ways, and for the splendid influence exerted by so many of your members.

We trust that in the trying days that lie ahead, the members of your noble profession may find very real satisfaction in their ministry.

Yours sincerely,

(Sgd.) A. HENRY ORR,
Hon. Secretary.

52 Clarendon Road,
Stanmore.

Obituary.

AENEAS JOHN McDONNELL.

DR. AENEAS JOHN McDONNELL, whose death was announced recently in these pages, was born at "Prospect", Kangaroo Point, Brisbane, on March 7, 1864. His father was Lieutenant-Colonel John McDonnell, first State commandant of Queensland and under secretary to the Post Office. His education was started at the Brisbane School. Here he won the University of Sydney prize medal for English history at the junior public examination in 1881, and the University of Sydney prize medal for European history at the senior public examination in 1883. Subsequently he became an undergraduate in medicine at the University of Sydney. He obtained honours on several occasions at the yearly examinations, and graduated Bachelor of Medicine and Master of Surgery with honours in 1889; he took his M.D. (Sydney) in 1896; and he was a foundation fellow of the Royal Australasian College of Surgeons. He was the first house surgeon appointed to the Toowoomba General Hospital, Queensland, in 1889 and he practised in Toowoomba as a general practitioner and in later years devoted most of his time to surgery. He was appointed junior surgeon in 1891 and retained this till 1906, when he was appointed senior surgeon, and he held this position till he retired in 1934, when he was appointed honorary consulting surgeon. During the War he held the rank of honorary captain in the Australian Army Medical Corps and had charge of a military hospital at Toowoomba during the War.

His ability as a surgeon was widely recognized by his colleagues. He was asked to represent the University of Sydney at the inaugural meeting of the Royal Australasian College of Surgeons at Canberra in 1927, as one of the university's earliest and most distinguished graduates in medicine.

From 1909 to 1934 he was a member of the Queensland medical Board, at one time was a member of the council of the Australasian Trained Nurses Association, and he was a member of the committee of the Toowoomba branch of the Queensland Ambulance Transport Brigade. He was a member of the Senate of the Queensland University from 1914 to 1916, and a Fellow and for many years corresponding secretary in Toowoomba of the Royal Empire Society. He travelled extensively in the East, Europe and America, and studied at the Johns Hopkins University, Baltimore, and in Vienna. In his early years he travelled much. He was fond of reading and he had a very fine library covering a wide range in literature. Throughout his life he read the classics, particularly Horace and Virgil, almost daily and he collected old prints and china. He married Miss Helen Walter, who predeceased him by four years. He had one son.

Dr. T. P. Connolly writes:

A few weeks ago there passed away a very remarkable man in our medical world, namely, Aeneas John McDonnell.

He was one of the earliest graduates of the Sydney medical school, and was one of its greatest. Graduating in 1889, he had been in practice for fifty years and held the position of honorary surgeon to the Toowoomba Hospital for forty-eight years. He was a man of exceptional ability, keen, enthusiastic and a wonderful worker. A man of poor physique, it was astounding the amount of work that he did in his long career. Coming to Toowoomba in 1889, he blazed the trail of surgery in southern Queensland. He maintained the highest ideals in his profession and encouraged every young medico to carry out the ideals he so highly prized. A general reader, he kept himself abreast of the times in medicine and surgery—widened his knowledge constantly reading the classics, Bible *et cetera*. Books had been his delight and he combined intellectual preeminence with nobility of character. He was a cultured gentleman and in no profession does culture count for so much as in medicine, for it keeps a man sweet and whole amid the most debasing conditions. His practice was an extremely arduous one; he often travelled long distances in the most trying conditions. On many occasions he was compelled to engage special trains to enable him to give practical advice to fellow practitioners hundreds of miles away.

A great friend to nurses as well as medical practitioners, he was always ready to fight their battles for better conditions and helped many a nurse to attain a leading position. Those that failed he was always delighted to help in a most generous manner. Many a medico that had fallen by the wayside will remember the generosity of our late friend.

For many years he was a member of the Queensland Medical Council and did good work for that council. He had an extraordinary knowledge of every practitioner in Queensland. As a member of the Senate of the Queensland University he went to the greatest trouble in securing the methods of control and organization of practically every leading university in the English-speaking world.

As honorary surgeon to the Toowoomba Hospital for almost fifty years, he gave the best of his life's work. The rapid growth of the hospital is due primarily to his outstanding work. He was very helpful to resident medical officers. A great teacher, he cultivated system, method and punctuality, which increased his capacity for work. He was quick in action, alert, business-like, and wished all those associated with him to adopt the same characteristics. His surgical ability was outstanding. His vast experience as a general practitioner, his studious attention to every recent surgical procedure gave him a sound basis. His judgement was good, he was deft and quick in his technique, a sound diagnostician and always gave the impression that he was an artist in his work and had confidence in his ability. To few, it has been said, is given the tenacity of will which enables a man to pursue a cherished purpose through half a century. To fewer still is fruition granted. This tenacity of purpose our late friend possessed and its fruition was granted to him in attaining a very high pinnacle in his profession. In the words of Osler: "To him—as the trusted family counsellor—the father came with his anxieties, the mother with her hidden grief, the daughter with her trials and the son with his follies, and to all he gave comfort and help with courage and cheerfulness." As one of the leading practitioners in this State, with high ideals, he made many friends, who will sadly miss him.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 128, of November 9, 1939.

AUSTRALIAN MILITARY FORCES.

NORTHERN COMMAND.

First Military District.

Australian Army Medical Corps.

Lieutenant K. R. McGregor is transferred from the 15th Battalion and to be Captain (provisionally) supernumerary to establishment, pending absorption, 29th September, 1939. Honorary Captain D. A. B. Carter is appointed from the Reserve of Officers (A.A.M.C.) and to be Captain (provisionally) supernumerary to establishment pending absorption, 30th September, 1939.

Australian Army Medical Corps Reserve.

To be Honorary Captains—Geoffrey Edwin Lamport Marshall, 2nd October, 1939; Thomas Roy Biggs, George Muir Redshaw and Thomas Victor Stubbs-Brown, 10th October, 1939.

EASTERN COMMAND.

Second Military District.

Australian Army Medical Corps.

To be Captain (provisionally)—Henry George Douglas Cookson, 6th October, 1939. *To be Captain (provisionally) supernumerary to establishment pending absorption*—John Baldwin Waters Meredith, 12th October, 1939. Lieutenant M. S. Alexander is transferred from the Sydney University Regiment and to be Captain (provisionally) supernumerary to establishment pending absorption, 20th September, 1939.

SOUTHERN COMMAND.

Third Military District.

Australian Army Medical Corps.

Captain H. S. Jacobs, V.D., is appointed from the Reserve of Officers (A.A.M.C.), 7th October, 1939.

Australian Army Medical Corps Reserve.

The resignation of Honorary Captain I. G. McLean of his commission is accepted, 22nd September, 1939.

Fourth Military District.

Australian Army Medical Corps Reserve.

To be Honorary Captains—Gemmel Tassie, 3rd October, 1939; Alistair Campbell McEachern and Allan Dunstan Lamphee, 4th October, 1939; Kenneth Harold Heard, 5th October, 1939; Ernest John Keith Harbison, 6th October, 1939; and Joseph Ruskin Cornish, 12th October, 1939. *To be Honorary Lieutenant*—Frederick Christopher Fraser, 5th October, 1939.

Sixth Military District.

Australian Army Medical Corps Reserve.

To be Honorary Captains—William Arnold Hillman and Kenneth Lauchlan Wise, 5th October, 1939.

WESTERN COMMAND.

Australian Army Medical Corps.

Captain (provisionally) A. M. Clarke is brought on the authorized establishment, 2nd October, 1939; Captain (provisionally) J. B. Mathieson is borne supernumerary to establishment pending absorption, 2nd October, 1939.

Australian Army Medical Corps Reserve.

To be Honorary Captains—Norman Henry Robinson, William Cawley and Hugh Charles Callagher, 6th October, 1939.—(Ex. Min. No. 367—Approved 8th November, 1939.)

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on November 6, 1939.

The degree of Bachelor of Surgery was conferred upon Don Cresswell Howie.

The following appointments were made: Dr. E. G. Hallsworth, of the University of Leeds, as Lecturer in Agricultural Chemistry in the Department of Agriculture; Dr. N. M. Gregg as Lecturer in Ophthalmology in the room of Dr. Granville Waddy, who has resigned.

The Vice-Chancellor, Dr. R. S. Wallace, has been appointed by the University of Western Australia to act as a Commissioner to conduct an inquiry into the whole position and activities of the University of Western Australia.

Tenders were accepted for the erection of a new lodge and gates at the university main entrance facing Derwent Street, Glebe.

Dame Eadith Walker Memorial Library.—The Senate has decided that the bequest of £5,000 from the late Dame Eadith Walker should be set aside for the equipment and maintenance of an additional (open access) reading room in the Fisher Library.

Degree of Doctor of Medicine (M.D.).—On the recommendation of the Faculty of Medicine the Senate has decided to confer the degree of Doctor of Medicine on Frieda R. Heighway. This is the first occasion in the history of the university that a woman graduate has complied with the conditions prescribed for the doctorate in medicine. Dr. Heighway is the wife of Dr. A. A. Abbie, the senior lecturer in anatomy in the university. She graduated as Bachelor of Medicine and Bachelor of Surgery with second class honours in 1930. Her thesis on an anatomical subject has been adjudged by Professor Wood Jones, of the University of Manchester, Professor Goldby, of the University of Adelaide, and Professor Burkitt, of the University of Sydney, as an original contribution of distinguished merit, adding to the knowledge of anatomical science.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act*, 1938-1939, of New South Wales, as duly qualified medical practitioners:

Brookfield, William Melville Will, M.B., Ch.B., 1937 (Univ. New Zealand), St. George District Hospital, Kogarah.

Guinane, Francis Robert, M.B., B.S., 1930 (Univ. Melbourne), Mendooran. (Provisional registration for three months from October 4, 1939.)

McNamara, Kevin Nicholas, M.B., Ch.B., 1937 (Univ. New Zealand), Royal North Shore Hospital, St. Leonards.

Nominations and Elections.

THE undermentioned has applied for election as a member of the Queensland Branch of the British Medical Association:

Skyring, Doris Una, M.B., B.S., 1935 (Univ. Sydney), Rockhampton.

The undermentioned has applied for election as a member of the Victorian Branch of the British Medical Association:

Epstein, Zygmunt, M.D., 1937 (Rome), 167, Barkly Street, Footscray.

The undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Santow, Geza Stephan, L.R.C.P., L.R.C.S. (Edinburgh), 1939, L.R.F.P.S. (Glasgow), 1938, 105, Tudor Street, Hamilton.

Stening, Warwick Sydney Lees, M.B., B.S., 1938 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Carter, John Northleigh, M.B., B.S., 1939 (Univ. Sydney), Royal South Sydney Hospital, Zetland.

Basil-Jones, Brian James, M.B., B.S., 1939 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

Diary for the Month.

Nov. 28.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Nov. 30.—South Australian Branch, B.M.A.: Branch.
Nov. 30.—New South Wales Branch, B.M.A.: Branch.
Dec. 5.—New South Wales Branch, B.M.A.: Executive and Finance Committee, Organization and Science Committee.
Dec. 6.—Victorian Branch, B.M.A.: Annual meeting.
Dec. 6.—Western Australian Branch, B.M.A.: Council.
Dec. 7.—South Australian Branch, B.M.A.: Council.
Dec. 8.—Queensland Branch, B.M.A.: Annual Meeting.
Dec. 12.—New South Wales Branch, B.M.A.: Ethics Committee.
Dec. 12.—Tasmanian Branch, B.M.A.: Branch.
Dec. 14.—New South Wales Branch, B.M.A.: Branch.
Dec. 15.—Queensland Branch, B.M.A.: Council.
Dec. 19.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Dec. 29.—Tasmanian Branch, B.M.A.: Council.

Medical Appointments.

Dr. S. M. Stephenson has been appointed Government Medical Officer at Barcaldine, Queensland.

* * *

Dr. J. V. Garner has been appointed Government Medical Officer at Cowra, New South Wales.

* * *

Dr. A. R. Southwood and Dr. H. K. Fry have been appointed members of the Advisory Committee under the *Food and Drugs Act*, 1908-1935, of South Australia.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xvi-xviii.

BALLARAT AND DISTRICT BASE HOSPITAL, BALLARAT, VICTORIA: Resident Medical Officers.

CHILDREN'S HOSPITAL (INC.), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.

PUBLIC SERVICE COMMISSIONER, ADELAIDE, SOUTH AUSTRALIA: Temporary Medical Officer.

RENWICK HOSPITAL FOR INFANTS, SUMMER HILL, NEW SOUTH WALES: Honorary Morbid Anatomist.

SYDNEY HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Clinical Assistants.

THE PRINCE HENRY HOSPITAL, LITTLE BAY, SYDNEY, NEW SOUTH WALES: Prince Henry Hospital Medical and Surgical Fellowships.

THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY, NEW SOUTH WALES: Resident Medical Officers.

WESTERN SUBURBS HOSPITAL, CROYDON, NEW SOUTH WALES: Honorary Officers.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	Associated Medical Services Limited. All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Federated Mutual Medical Benefit Society. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	Wiluna Hospital. All Contract Practice Appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad *per annum* payable in advance.